Proposal for State College Area School District's

Mount Nittany Elementary School

INTEGRATED PROJECT DELIVERY / BUILDING INFORMATION MODELING STUDIO - SPRING 2011

Terra Vexillum

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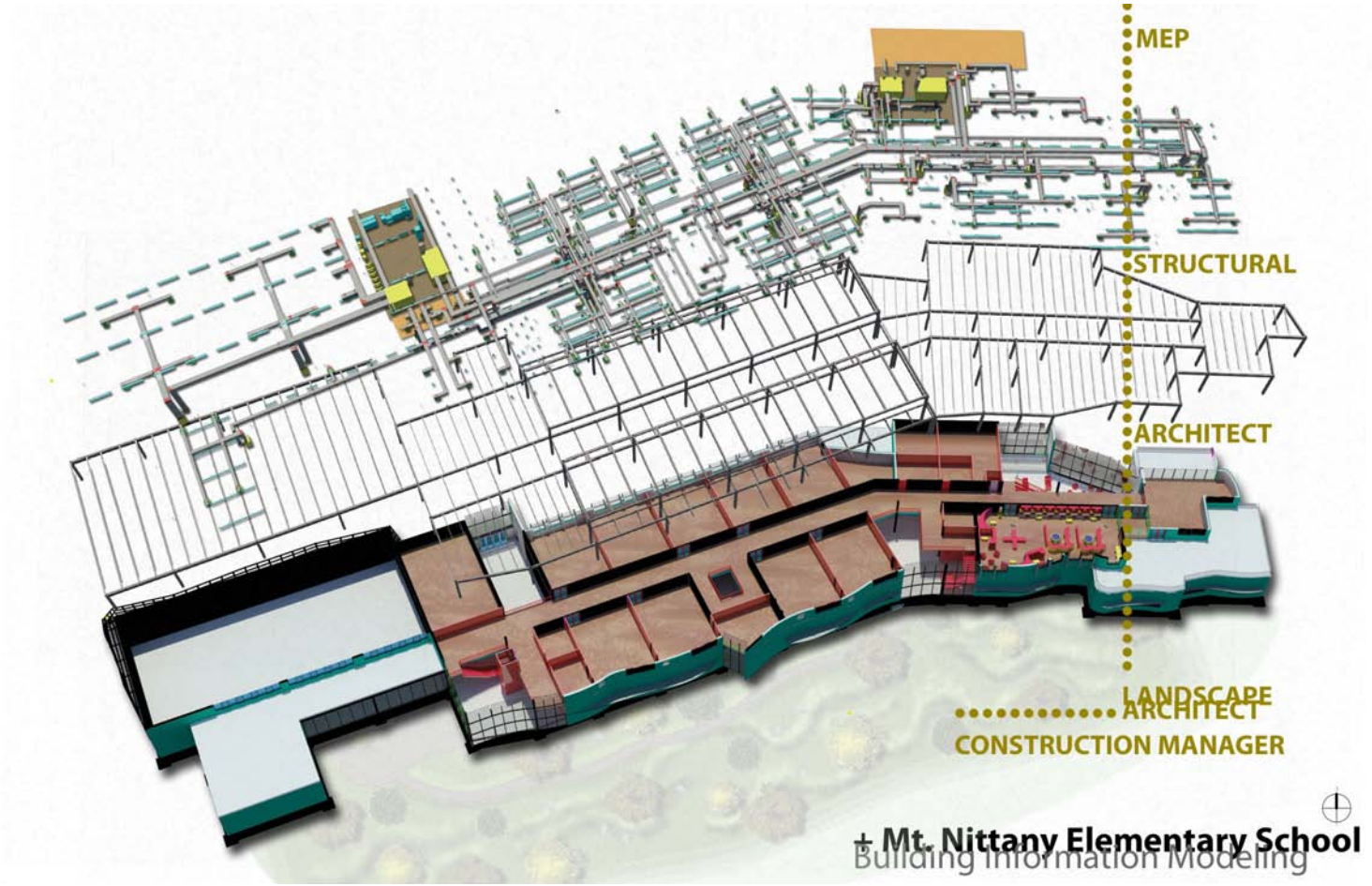
Department of Landscape Architecture
Department of Architectural Engineering

Submitted

May 2, 2011

Contents



Project Information

Project Owner: State College Area School District

Project Name: Mount Nittany Elementary School

Project Location: Lowder St. State College, PA 16801

Contract Type / Delivery Method: IPD

Brief Project Description: Consolidate the Boalsburg and Panorama Village Elementary schools in a New Elementary School at the Panorama Village site. Replace the current Ferguson Township Elementary School through a combination Renovation/New Construction project. Total SQFT. 58,333. Approx. 400 students

Additional Project Information: Utilize BIM programs throughout the design process.

Project Schedule / Phases / Milestones: Include BIM milestones, pre-design activities, major design reviews, stakeholder reviews, and any other major events which occur during the project lifecycle.

above: The proposed integration of the Mt. Nittany Elementary School

PRIORITY (HIGH/MED/LOW)	GOALDESCRIPTION	POTENTIAL BIM USES
High	Minimize conflicts through disciplines	Programming, 3D Coordination
High	Design and construction efficiency	3D Coordination, Cost Estimation, Energy Analysis
Med	Comprehensive Design Development to all construction standards	Design Authoring
Med	Increase effectiveness of sustainable construction methods	Energy Analysis/LEED
High	Accurate 3D model	3D Modeling/ Coordination/Design Authoring
Med	Implement 4D modeling and track progress	4D Modeling

X	PLAN	X	DESIGN	X	CONSTRUCT	X	OPERATE
x	PROGRAMMING	x	DESIGN AUTHORING	_	SITE UTILIZATION PLANNING	_	BUILDING MAINTENANCE SCHEDULING
x	SITE ANALYSIS	x	DESIGN REVIEWS	_	CONSTRUCTION SYSTEM DESIGN	_	BUILDING SYSTEM ANALYSIS
		x	3D COORDINATION	_	3D COORDINATION	_	ASSET MANAGEMENT
		x	STRUCTURAL ANALYSIS	_	DIGITAL FABRICATION	_	SPACE MANAGEMENT / TRACKING
		x	LIGHTING ANALYSIS	_	3D CONTROL AND PLANNING	_	DISASTER PLANNING
		x	ENERGY ANALYSIS	x	RECORD MODELING	_	RECORD MODELING
		x	MECHANICAL ANALYSIS	_		_	
			OTHER ENG. ANALYSIS	_		_	
		x	SUSTAINABLITY (LEED) EVALUATION	_		_	
		x	CODE VALIDATION	_		_	
_	PHASE PLANNING (4D MODELING)	x	PHASE PLANNING (4D MODELING)	x	PHASE PLANNING (4D MODELING)	_	PHASE PLANNING (4D MODELING)
x	COST ESTIMATION	x	COST ESTIMATION	M	COST ESTIMATION	_	COST ESTIMATION
M	EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING	_	EXISTING CONDITIONS MODELING	_	EXISTING CONDITIONS MODELING

X – To be included in project design

M – Possibly to be included in project design

_ – Not to be included in project design

above: Major BIM Goals and Objectives

BIM Uses

BIM Execution Plan

To successfully implement Building Information Modeling (BIM) on a project, the project team has developed this detailed BIM Project Execution Plan. The BIM Project Execution Plan defines uses for BIM on the project along with a detailed design of the process for executing BIM throughout the project lifecycle.

Mission Statement: To create a safe and sustainable learning environment, using a proactive integrated design process.

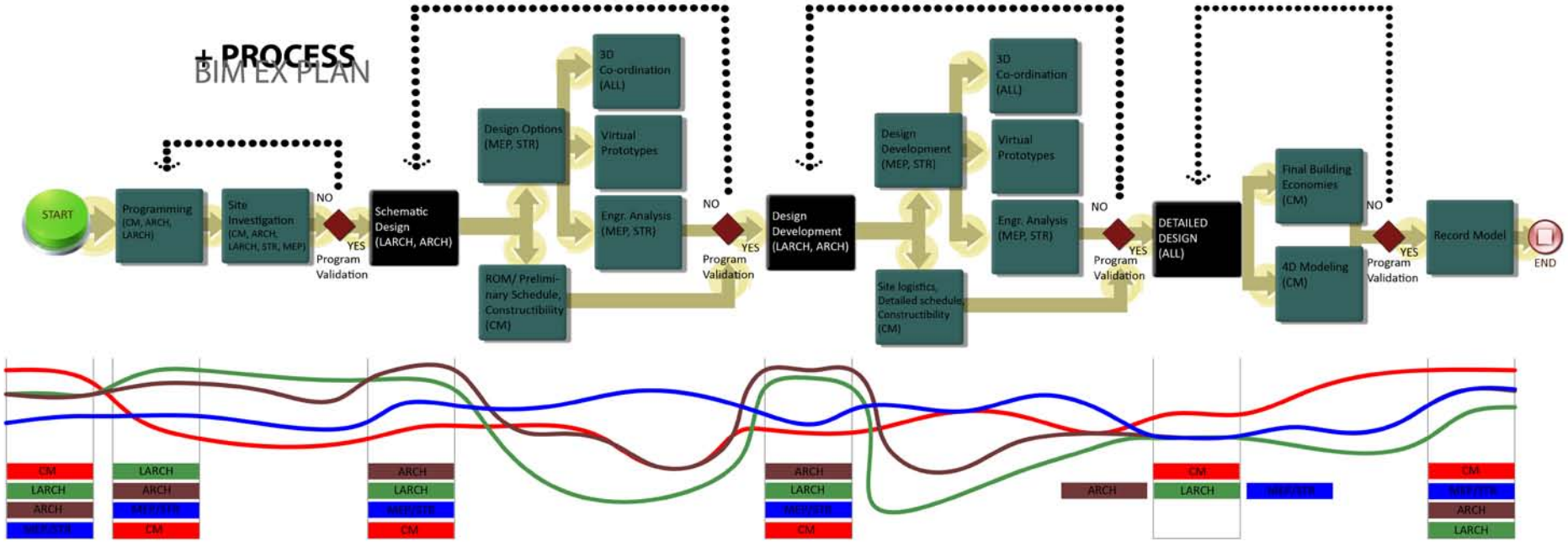
BIM Goals

Provide space and energy efficient environment that will support the learning programs

Take a pro-active approach to construction, documentation, and coordination in order to maximize efficiency and profitability

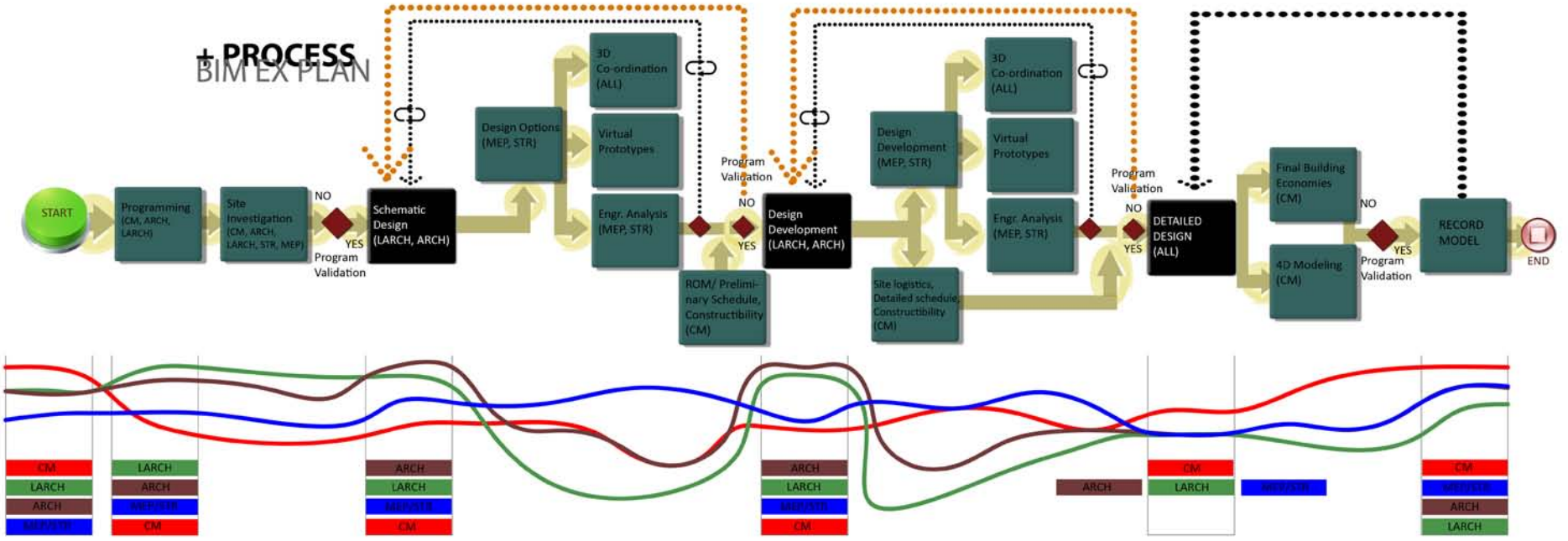
Provide a clear framework with clients

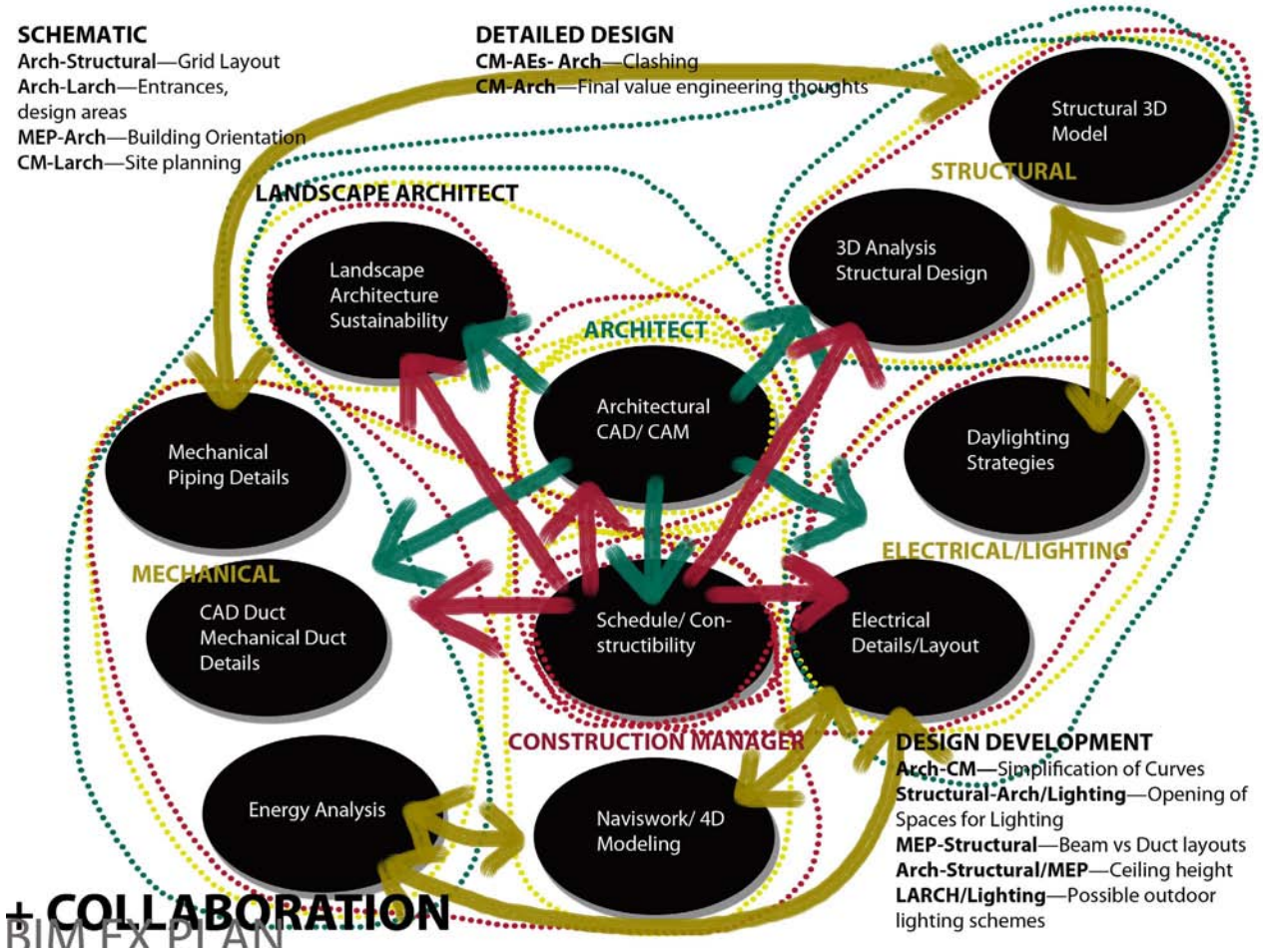
Build shared values and beliefs among all levels of people



above: BIM Ex plan during the schematic stage

below: BIM Ex plan after design development stage





COLLABORATION STRATEGY

Communication occured verbally when all members were present and by email or phone when not present.

Construction Manager kept copies of all working documents. File transfers were mainly through Project Wise and Drop Box. Backups were made on the Penn State AE Y drive and personal USB drives.

All decisions were taken by the team collectively and the responsibility graph in the BIM Ex was followed. In the event of a tie vote in team decisions, the decision will go to whichever individual is most responsible for that part of the project.

Meeting location: Stuckman Bldg/Sackett computer labs.

MEETING PROCEDURES

The following list is of the availability of the group members. The majority of group meetings will consist of all group members.

Sunday 11am – 11pm

Monday 3:30pm – 11pm

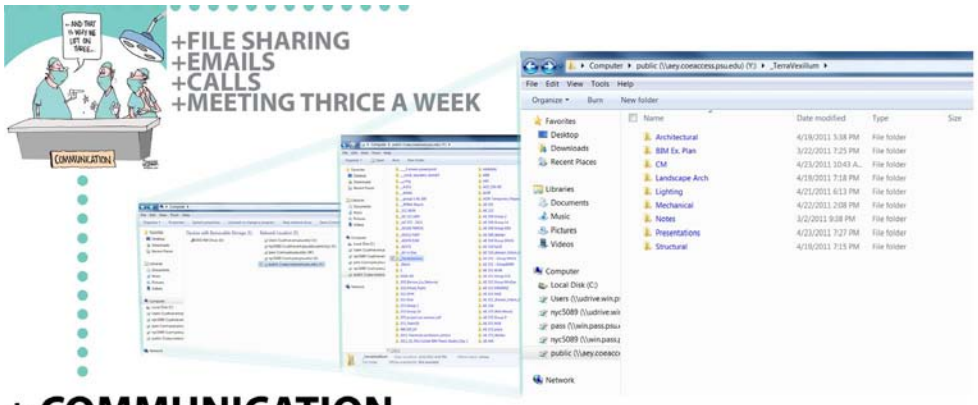
Tuesday 5:15 pm – 7:15 pm

Wednesday 3:30pm-11pm

Thursday 5:15 pm – 7:15 pm

Friday 3:30pm – 11pm

Saturday 11am – 11pm



+ CONCEPT
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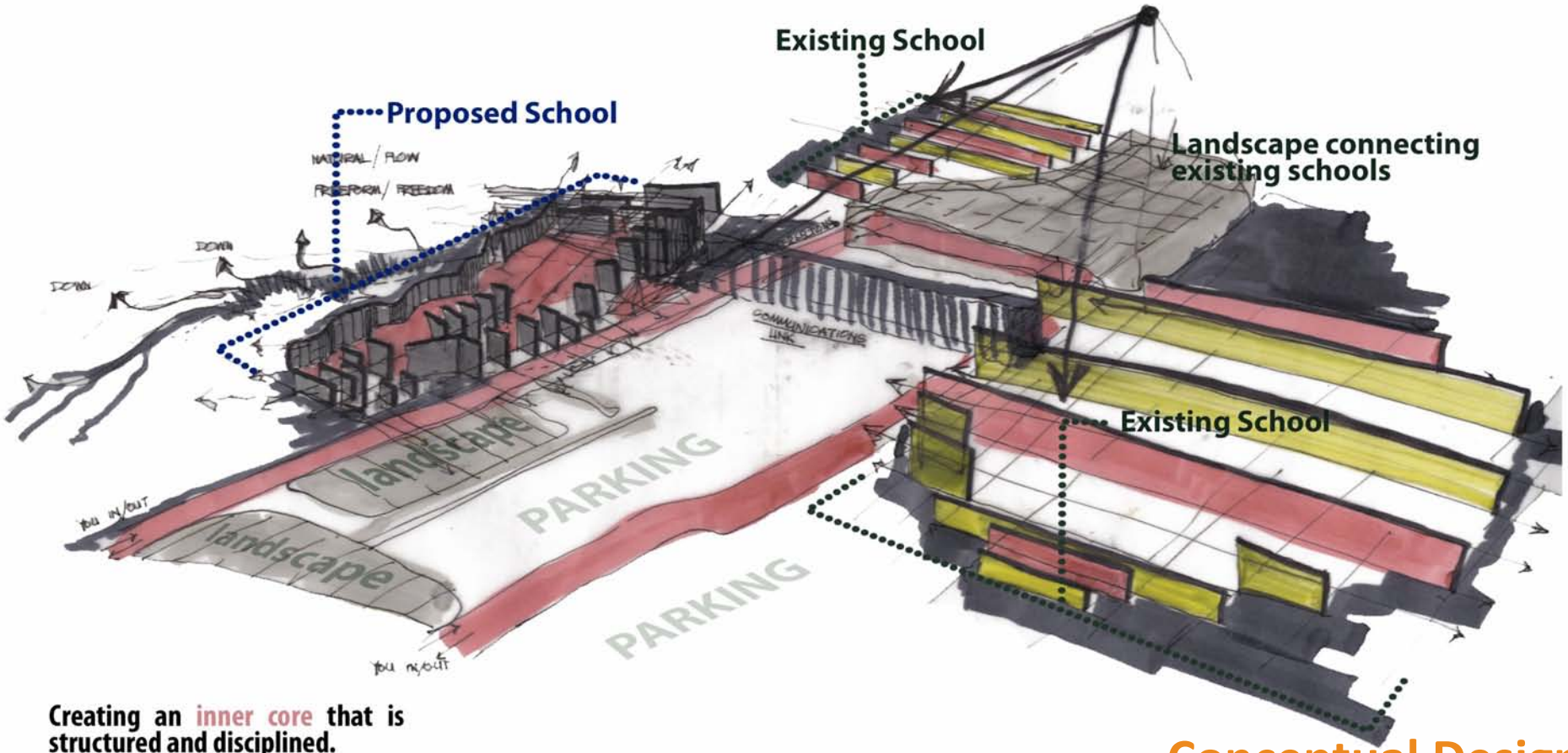


Creating an inner core that is structured and disciplined.

Outer core that is freeflow in form development responding to the ever-changing landscape.

Conceptual Design

Conceptual Statement

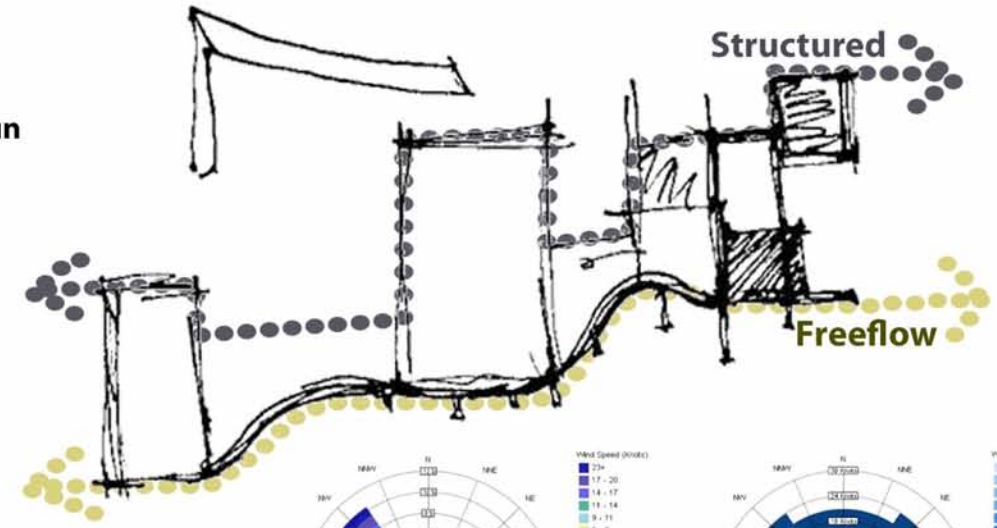
The concept is extends from the existing schools and parking lot located on the site. The geometic hard-scape of these areas reflects and element of formality and academia. Contrasting this on the southern portion of the site are grass fields and trees. The blending of these two opposing landscape forms meets at the location of the new Mount Nittany Elementary School. The front entry areas of the school and front landscape take a geometric and formal shape to them and use mostly hardscape materials. The rear of the building and landscape reflect natural curvalinear forms, contrasting the front. The building location cre-ates a centralized parking area and aids in defining space within the larger context of the site.

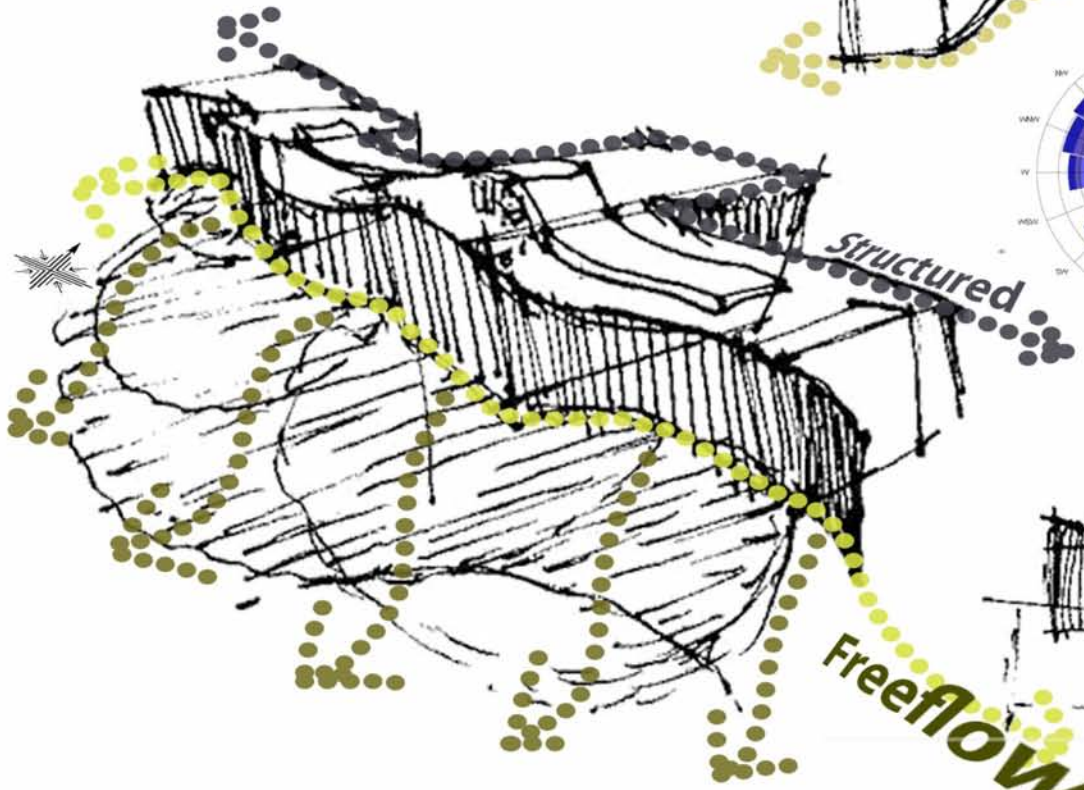
_The Form generation

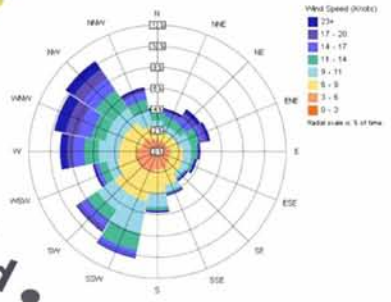
Three cores system
Curved south faced surface development from sun orientation and wind flow.

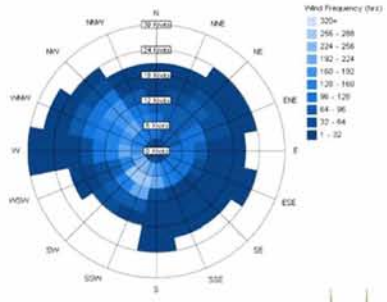
Creating an inner core that is structured and disciplined.

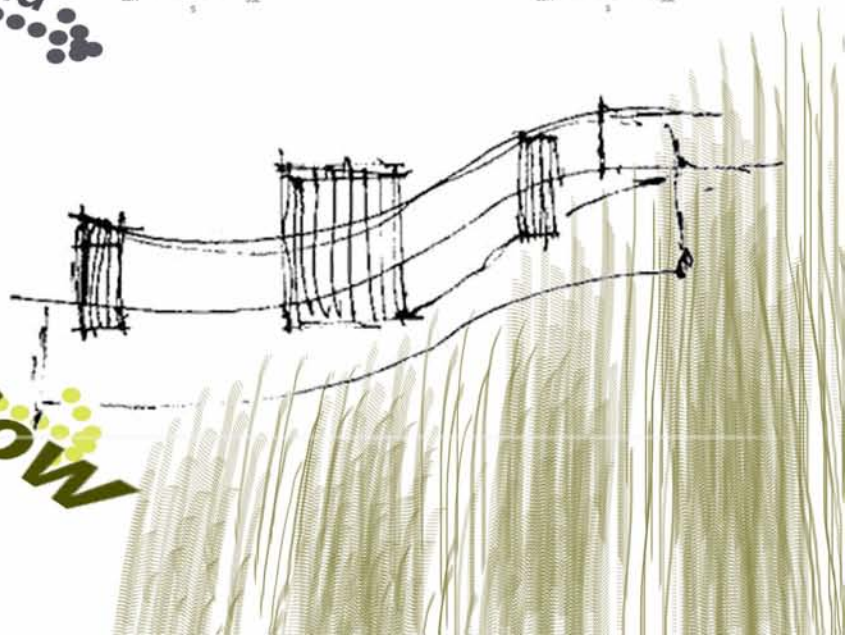
Outer core that is freeflow in form development responding to the ever-changing landscape.



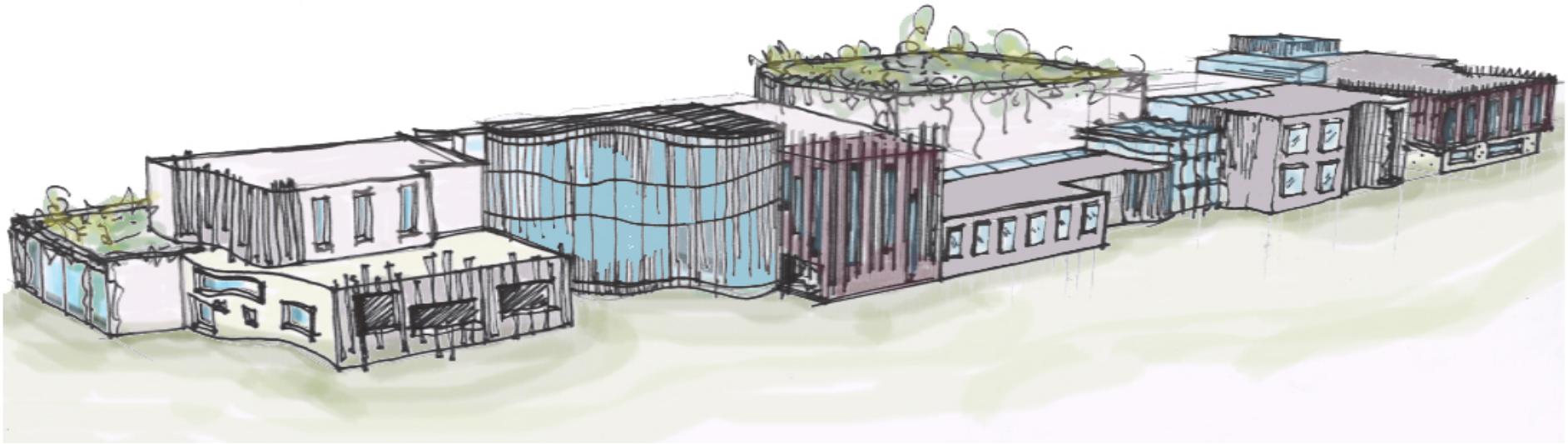






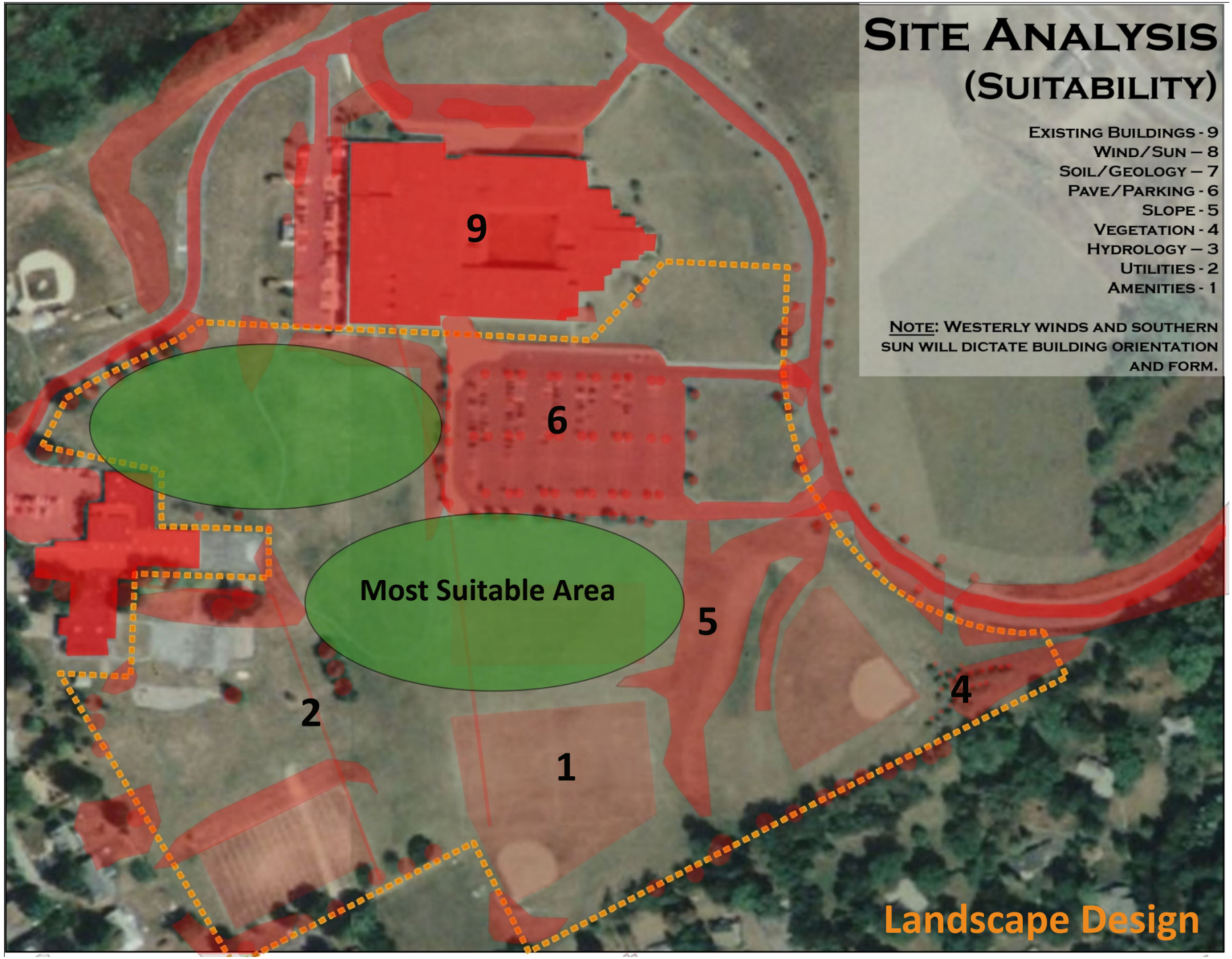


+ CONCEPT
BUILDING ARCH



Schematic Design

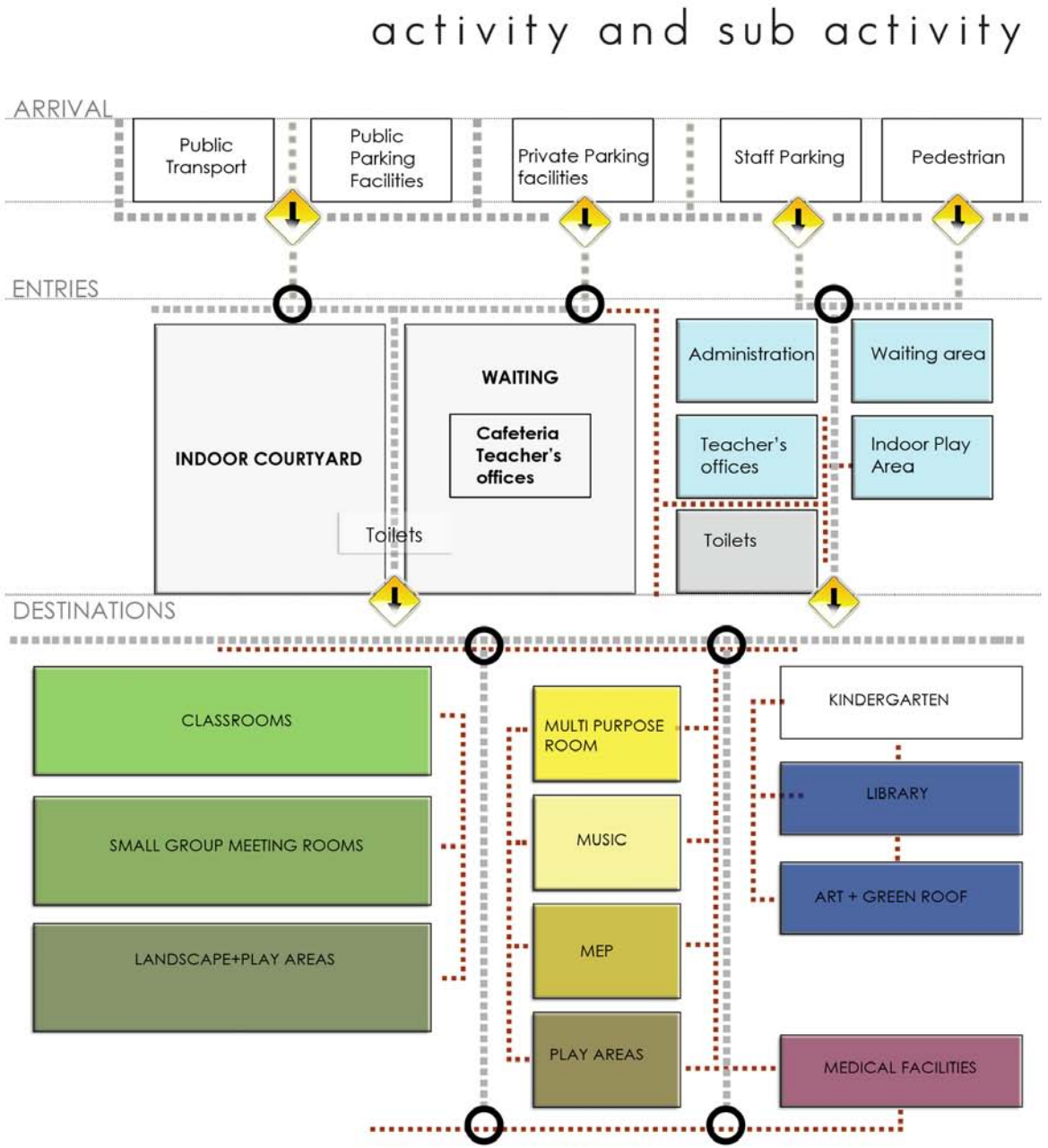
In the schematic design phase we had the basic shape and layout of our building as well as the site program elements that would be included and site circulation. Little detail was discussed in this design phase seeing as ideas would come and go quite quickly because of the intense iterative nature of the design process. Constructability and support issues were brought to attention through discussion among the different disciplines. Engineered systems were evaluated to determine which would have the best cost to efficiency ratio. All disciplines begin to physically coordinate systems and design at this point and lead to a more defined schematic design that can be tweaked through development.

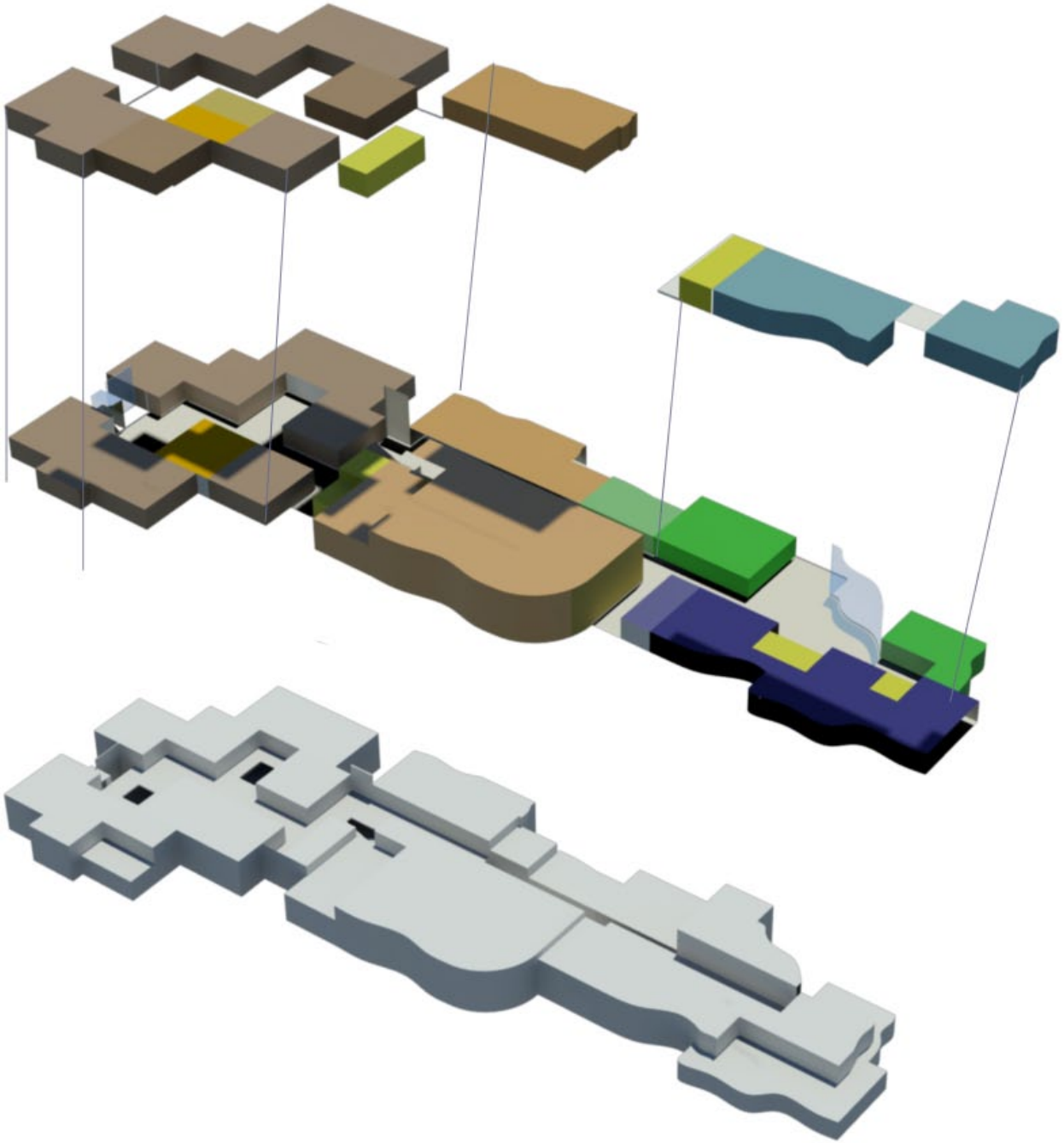

SITE ANALYSIS
(SUITABILITY)
EXISTING BUILDINGS - 9
WIND/SUN – 8
SOIL/GEOLOGY – 7
PAVE/PARKING - 6
SLOPE - 5
VEGETATION - 4
HYDROLOGY – 3
UTILITIES - 2
AMENITIES - 1
NOTE: WESTERLY WINDS AND SOUTHERN SUN WILL DICTATE BUILDING ORIENTATION AND FORM.
9
6
Most Suitable Area
5
4
2
1
Landscape Design

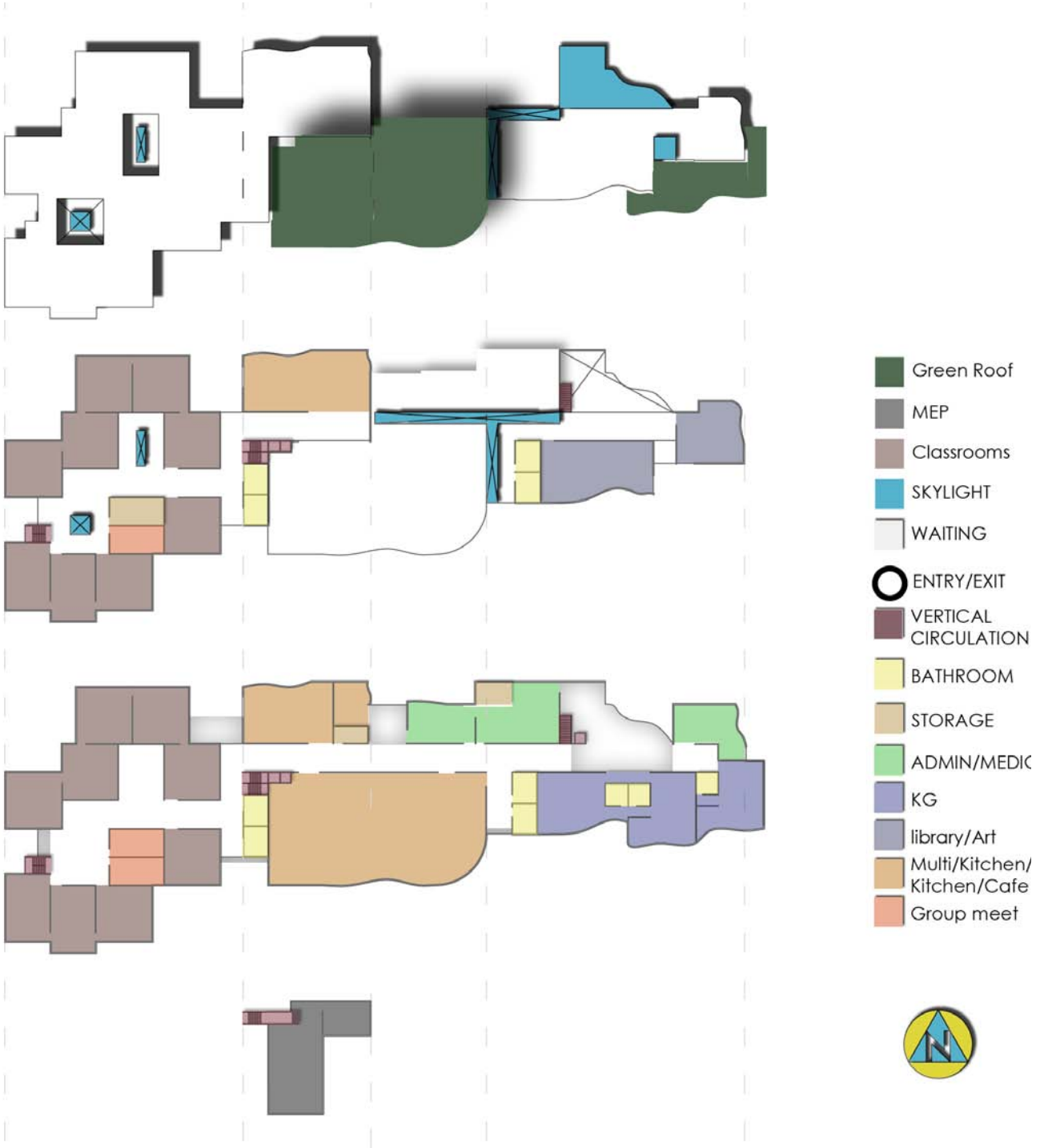
Inventory Analysis

It was important for our team to develop defining evidence of where the building would be located and how the program of the site would be organized. With this being a priority, we developed a plan delineating the hierarchy of site constraints that would inform our building location and developable areas. Geology, solar aspect ratio, and existing site features became some the highest priority elements in governing the site design and building orientation.

Architectural Design

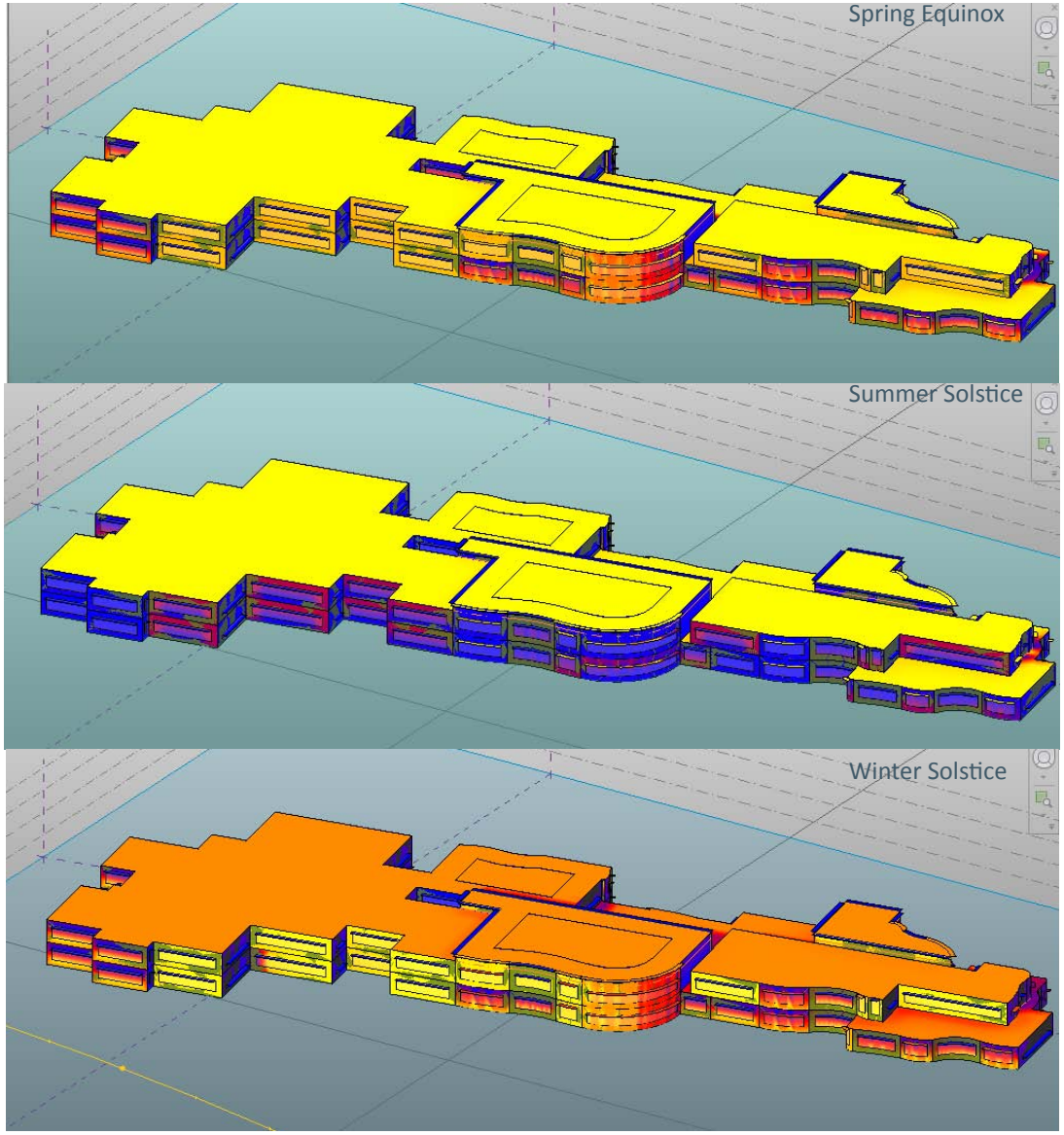





Green Roof
MEP
Classrooms
SKYLIGHT
WAITING
ENTRY/EXIT
VERTICAL CIRCULATION
BATHROOM
STORAGE
ADMIN/MEDIC
KG
library/Art
Multi/Kitchen/ Kitchen/Cafe
Group meet

Accessibility

Noise Levels



	Base (40% Glazing)	2' Shading	10 % Glazing East/West
Energy Use Intensity (kBtu/sf/yr)	65	62	60
Life Cycle Electricity Use (kWh)	18,152,719	16,805,154	16,468,697
Life Cycle Fuel (Therms)	404,774	413,506	397,150
Life Cycle Energy Cost	$1,047,351	$994,461	$969,373

3' Shading	2' Shading Heavy Const.	25% Glazing North Face	5 Degrees East	10 Degrees East	15 Degrees East
60	60	59	61	60	60
16,064,524	16,309,322	16,239,731	14,583,032	14,541,849	14,547,343
399,222	389,125	382,406	372,698	371,074	371,720
$953,160	$957,312	$949,984	$871,856	$869,027	$869,680

Building Performance Factors

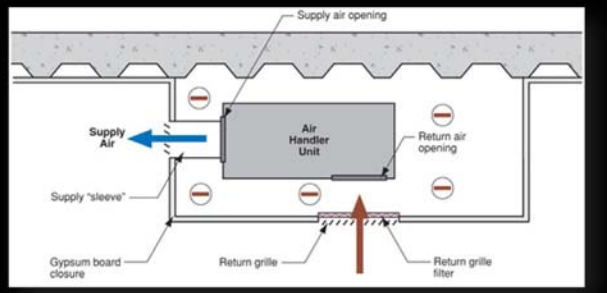
Location: State College, PA
Building Type: School or University
Outdoor Temperature: Max 82°F/Min -10°F
Electrical Cost: $0.10/kWh
Fuel Cost: $1.41/Therm

Radiation Analysis

Fan Coil Units

Advantages
Lower initial costs
Zone Control
Familiar Installation

Disadvantages
Fan Noise
High Maintenance
Separate Ventilation System

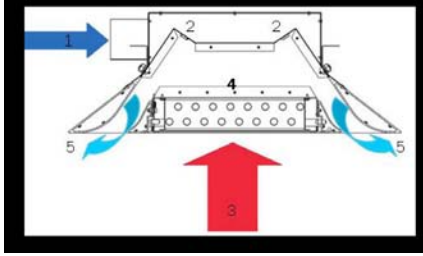


Lighting Analysis

Window Options

Pella Awning
Low E Glazing
U Value .25-.5
SHGC .32-.79
Light Trans. .4-.83

Traco Fixed
Low E Glazing
U Value .33



Chilled Beams

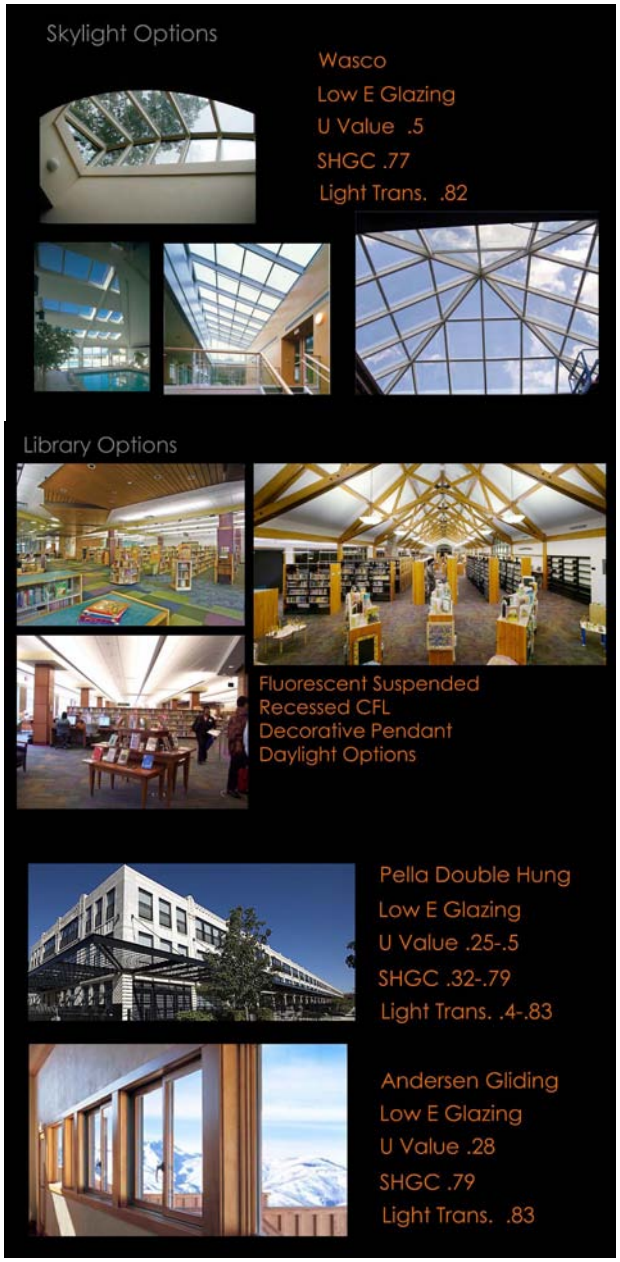
Advantages
High COP
Centralized Fan for Ventilation
Quiet
Low Maintenance
Lower Carbon Emissions
Prefabrication
Lower Construction Costs
Multi-purpose

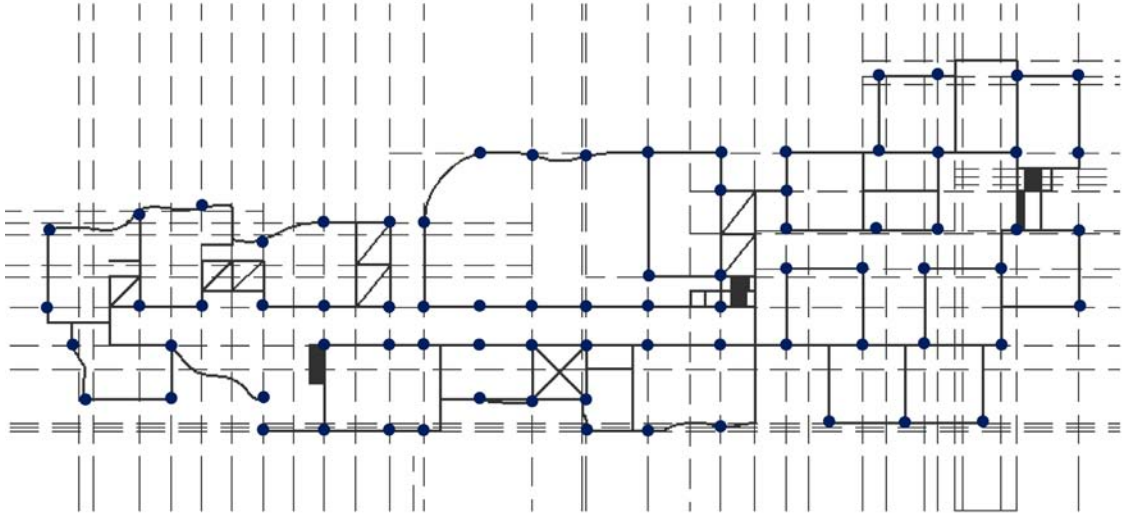
Disadvantages
Higher Cost
Operable Windows (Condensation)

Multipurpose Options

Metal Halide High Bay
Fluorescent Troffer
Fluorescent Suspended
Daylight Options

MEP Design





Masonry

Thermal Mass
Improves indoor environment quality
Use recycled content

Concrete

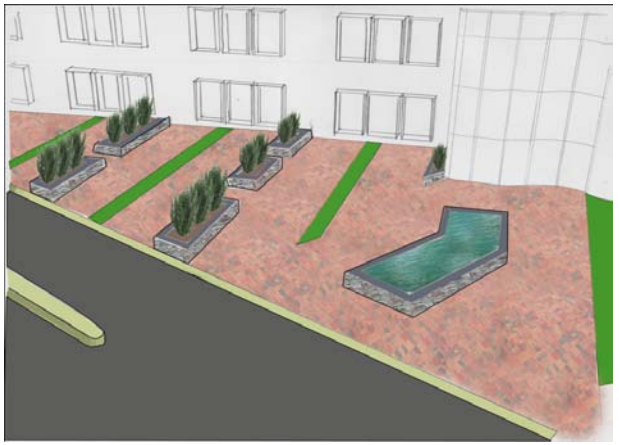
Reduce amount of cement due to CO_2 emissions
Replace cement with 15-25% fly ash or 15-40% slag
Use recycled aggregate

Structural Design

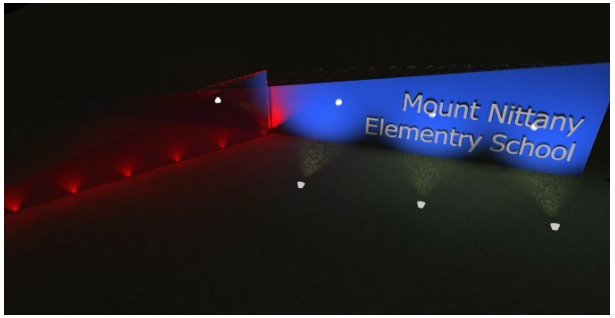
Design Development

Layout Diagram and Conceptual Renderings

After professional critiques and reevaluations of the design, the building had changed in terms of its layout. Conceptually, the landscape and building remained the same but internal organization had shifted due to accessibility issues, aesthetics, and way finding for building occupants. The gymnasium and kitchen area had been moved to the end of the building with classrooms becoming central. Entry areas to the building had been reduced and more clearly defined, in terms of day/evening entrances and vehicular drop-off points. The building and landscape now had much more definition to spaces and could now be moved forward to explore specific details. Constructability issues were resolved by reducing the amount of curved walls and identifying alternative construction methods for these areas. Mechanical and structural systems were chosen and began to have more detail in how they would support building function and be incorporated to the architectural design. 3D coordination of all disciplines was paramount in this design phase in order to prevent clashes and to create a clean model.

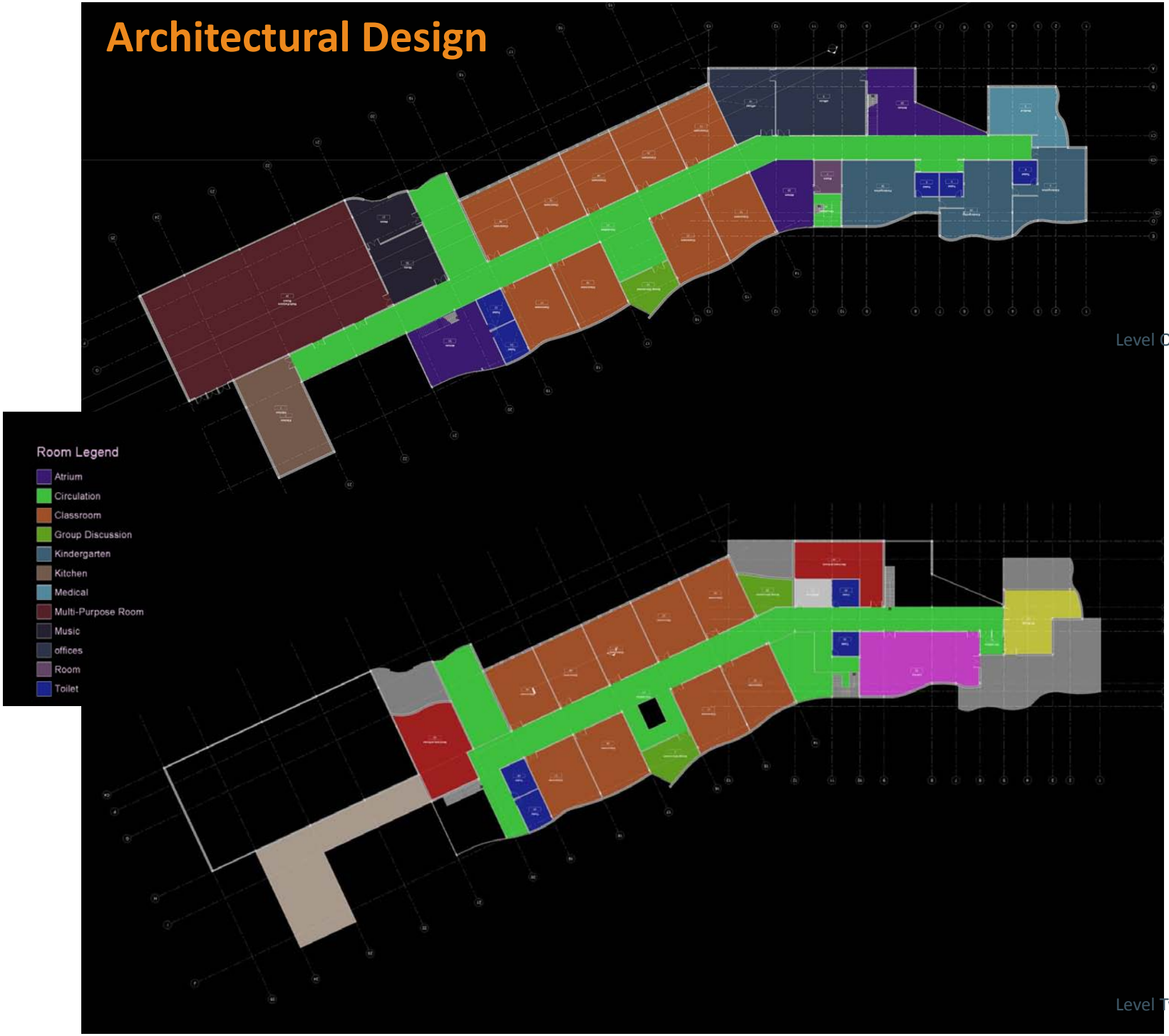


Landscape Design



Entry Plaza and the Front Play Area border the parking lot and illustrate a formalized linear form.

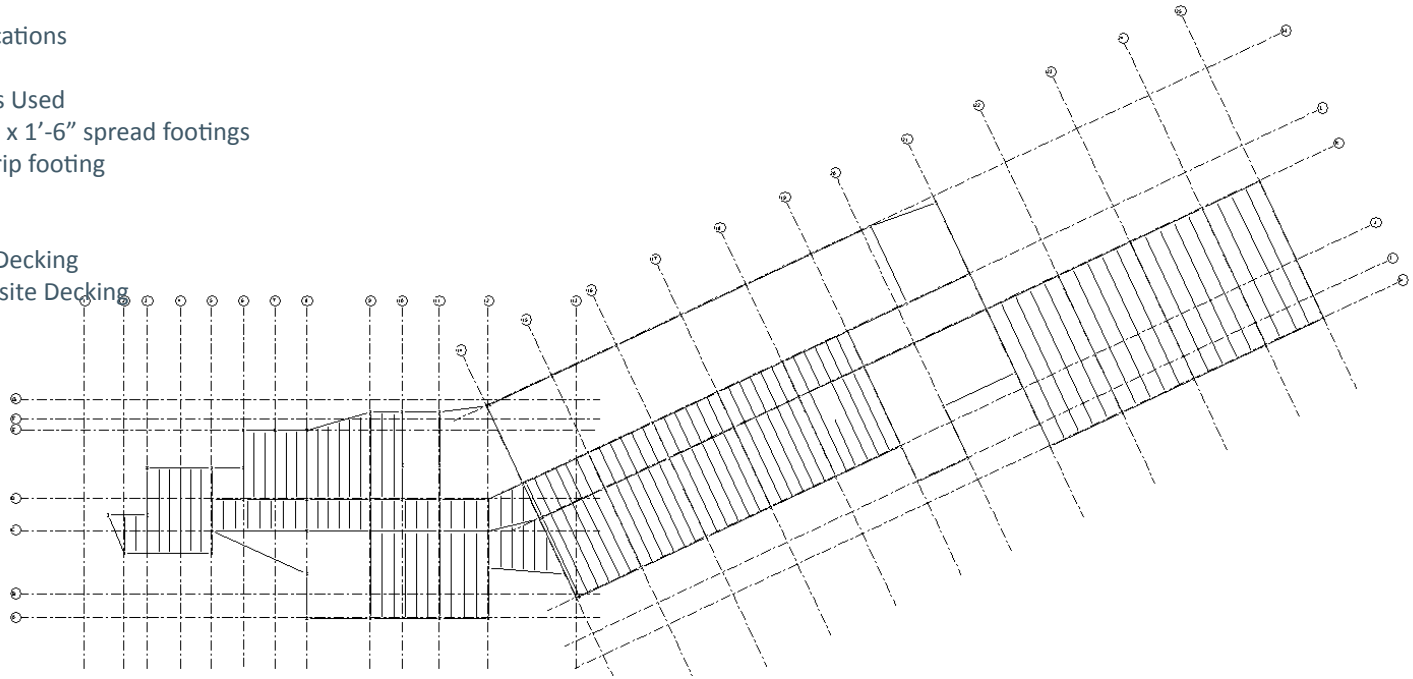
Architectural Design

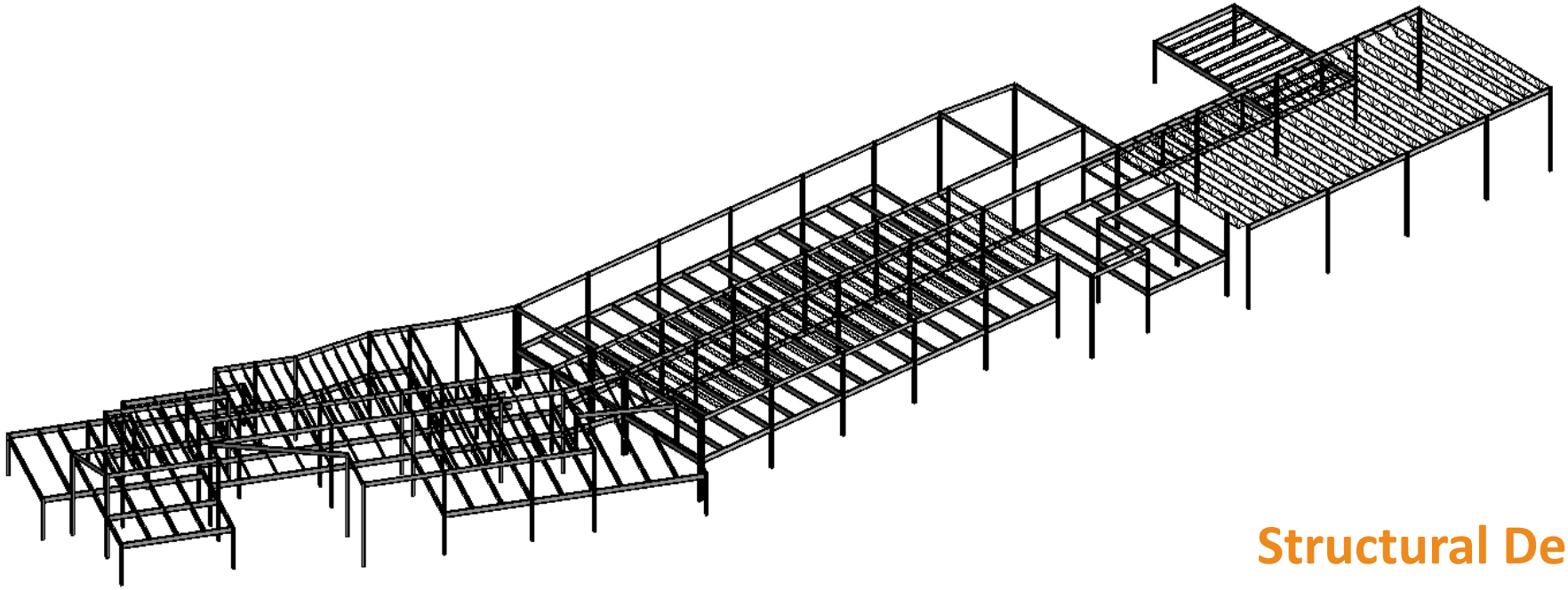


_Concerns for Foundations
_Water table
_Sinkholes
_Bedrock Locations

_Foundations Used
_5’-6” x 5’-6” x 1’-6” spread footings
_2’ x 1’-6” strip footing

_Floor Slabs
_Composite Decking
_Non-composite Decking





Structural Design

_Ground Source Heat Pump
_Smaller Mechanical Rooms
_Easy Maintenance
_Room Control
_High Efficiency

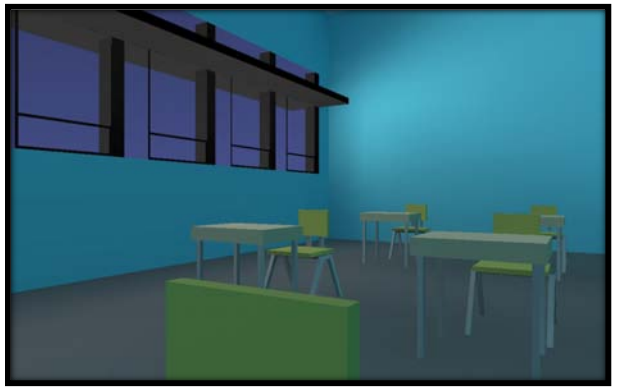
_Dedicated Outdoor Air System
_Ventilation Control
_Energy Recovery
_Smaller Duct Sizes

	4 Pipe, Fan Coil	Underfloor Air Distribution	Central VAV System
Energy Use Intensity (kBtu/sf/yr)	60	76	87
Life Cycle Electricity Use (kWh)	14,541,849	11,208	13,819,198
Life Cycle Fuel (Therms)	371,074	705,339	774,983
Life Cycle Energy Cost	$869,027	$938,614	$1,096,588

MEP Design

9 AM March 21

9 AM December 21



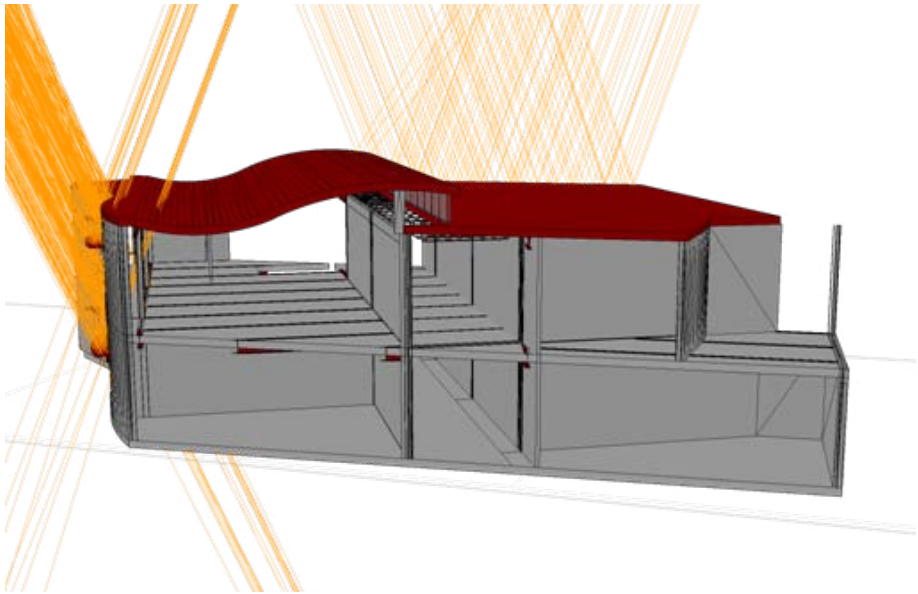
12 PM June 21

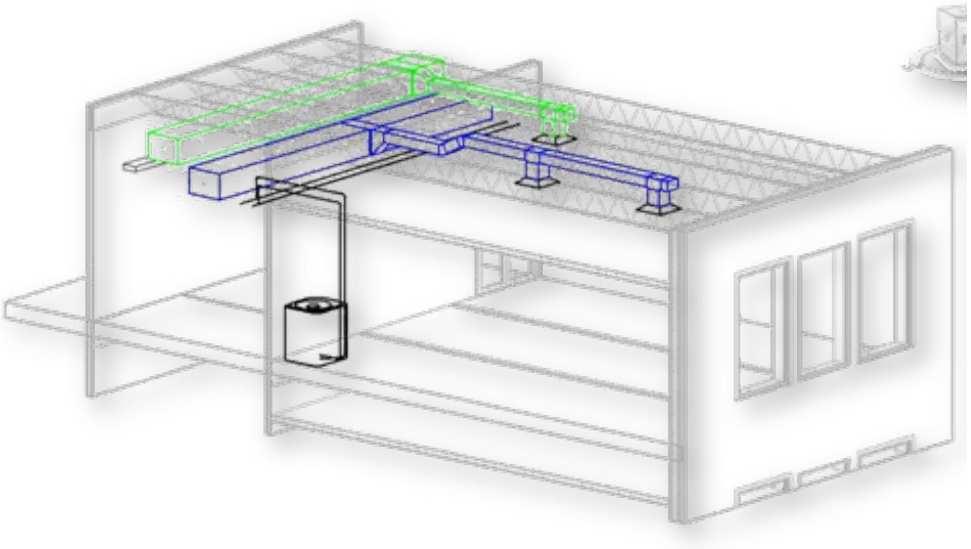
_IESNA
_# 2 pencil writing task
_30 fc
_Light Shelves

9 AM June 21

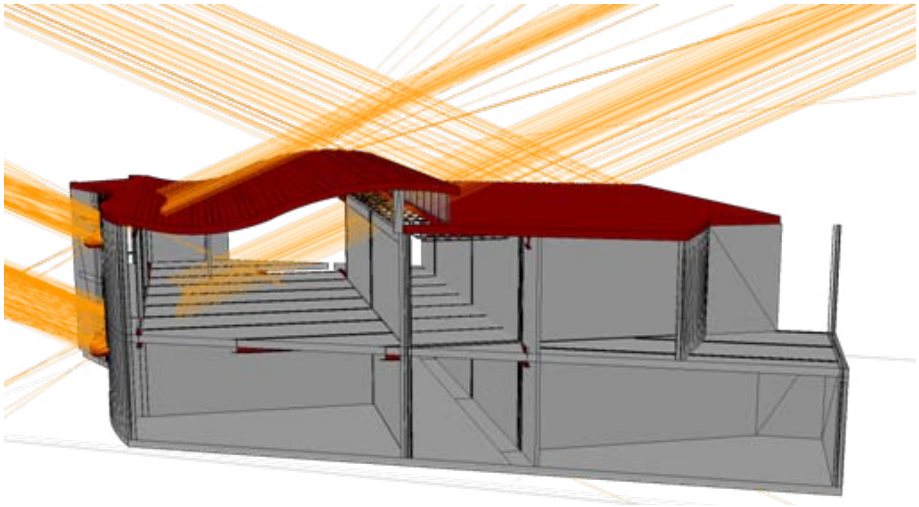
12 PM March 21

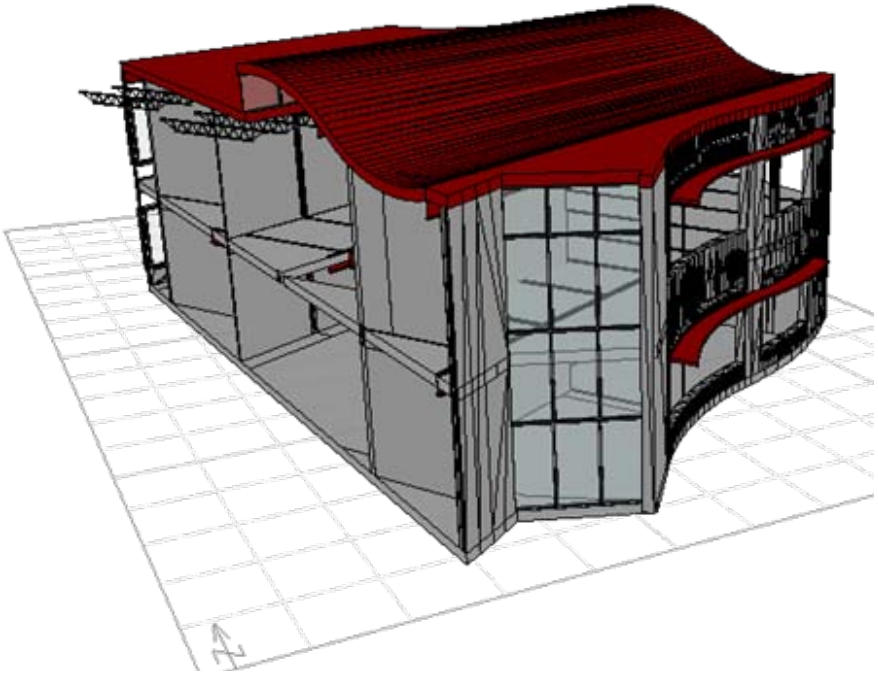
12 PM December 21





Summer





Winter

Facade Integration

Zone Checksums

By ACADEMIC

Default

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 14
Outside Air: OADB/WB/HR: 91 / 74 / 102

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	11,373	11,373	26
Glass Solar	3,974	0	3,974	9
Glass/Door Cond	640	0	640	1
Wall Cond	69	6	75	0
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	1,462		1,462	3
Sub Total ==>	6,145	11,379	17,524	40
Internal Loads				
Lights	2,751	688	3,439	8
People	11,250	0	11,250	25
Misc	819	0	819	2
Sub Total ==>	14,820	688	15,508	35
Ceiling Load	2,439	-2,439	0	0
Ventilation Load	0	0	14,967	34
Adj Air Trans Heat	0		0	0
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	0		0	0
Exhaust Heat		-3,810	-3,810	-9
Sup. Fan Heat			0	0
Ret. Fan Heat		0	0	0
Duct Heat Pkup		0	0	0
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	23,405	5,817	44,189	100.00

CLG SPACE PEAK

Mo/Hr: 9 / 12
OADB: 78

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	9,388	46
Glass/Door Cond	49	0
Wall Cond	7	0
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	129	1
Sub Total ==>	9,574	47
Internal Loads		
Lights	2,861	14
People	6,250	31
Misc	901	4
Sub Total ==>	10,012	49
Ceiling Load	691	3
Ventilation Load	0	0
Adj Air Trans Heat	0	0
Ov/Undr Sizing	0	0
Exhaust Heat		
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
System Plenum Heat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	20,278	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: 11

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-9,884	28.06
Glass Solar	0	0	0.00
Glass/Door Cond	-2,826	-2,826	8.02
Wall Cond	-347	-448	1.27
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0.00
Infiltration	-2,244	-2,244	6.37
Sub Total ==>	-5,418	-15,403	43.73
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-2,019	0	0.00
Ventilation Load	0	-22,974	65.22
Adj Air Trans Heat	0	0	0
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		3,153	-8.95
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
System Plenum Heat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-7,436	-35,224	100.00

TEMPERATURES

	Cooling	Heating
SADB	55.5	77.1
Ra Plenum	83.9	62.6
Return	83.9	62.6
Ret/OA	86.4	43.3
Fn MtrTD	0.0	0.0
Fn BldTD	0.0	0.0
Fn Frict	0.0	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	946	946
Terminal	946	946
Main Fan	946	946
Sec Fan	0	0
Nom Vent	354	354
AHU Vent	354	354
Infil	35	35
MinStop/Rh	0	0
Return	981	981
Exhaust	388	388
Rm Exh	0	0
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	37.4	37.4
cfm/ft²	1.10	1.10
cfm/ton	256.99	
ft²/ton	234.54	
Btu/hr·ft²	51.16	-40.78
No. People	25	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB °F	Enter WB °F	Enter HR gr/lb	Leave DB °F	Leave WB °F	Leave HR gr/lb
Main Clg	3.7	44.2	29.4	946	86.4	68.9	79.4	55.5	54.2	61.2
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	3.7	44.2								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	864		
Part	0		
Int Door	0		
ExFlr	0		
Roof	897	0	0
Wall	243	49	20
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-35.2	946	43.3	77.1
Aux Htg	0.0	0	0.0	0.0
Preheat	-12.7	946	43.3	55.5
Humidif	0.0	0	0.0	0.0
Opt Vent	0.0	0	0.0	0.0
Total	-35.2			

Project Name:
Dataset Name: TRACE001.trc

TRACE® 700 v6.2.6.5 calculated at 02:57 PM on 02/28/2011
Alternative - 1 System Checksums Report Page 1 of 1

STATE COLLEGE AREA SCHOOL DISTRICT
Mount Nittany School

ARCHITECTURAL SPACE PROGRAM

The designed architectural space calculations:

space	quantity		area/ space	total	notes
classrooms	18	@	900 s.f.	16,200 s.f.	
kindergarten rooms	3	@	1120 s.f.	3360 s.f.	(doesn't include bathrooms)
all-purpose room	1	@	5250 s.f.	5250 s.f.	
stage	1	@	1370 s.f.	1370 s.f.	
full service kitchen	1	@	1500 s.f.	1500 s.f.	
library	1	@	1920 s.f.	1920 s.f.	(includes work room+ office)
full size music room	1	@	1000 s.f.	1000 s.f.	
instrumental music room	1	@	1100 s.f.	1100 s.f.	(includes storage)
art room	1	@	1075 s.f.	1075 s.f.	(includes kiln room and stor.)
small group instruction	3	@	440 s.f.	1320 s.f.	
administrative offices	1	@	1485 s.f.	1485 s.f.	
nurse's suite	1	@	870 s.f.	870 s.f.	
mechanical space	1	@	1400 s.f.	1400 s.f.	(depends on mech system)*
bathrooms	5	@	450 s.f.	2250 s.f.	
faculty lunch	1	@	400 s.f.	400 s.f.	
Storage/Extra	1	@	1060 s.f.	1060 s.f.	
faculty work	1	@	380 s.f.	380 s.f.	
			Total Net Area	42360 s.f.	
			Circulation	15470 s.f.	

Total Gross Area 57,830 s.f.
(original program was 58333 s.f.)

	% of Total	Cost Per S.F.	Cost
Substructure	12.1	$17.34	$1,002,500
Sinkhole Contingency (6%)			$60,150
Shell	36.8	$52.65	$3,044,500
Design Authoring Markup (25%)		$13.16	$761,125
Interiors	16.3	$23.23	$1,343,500
Services	34.7	$49.53	$2,864,500
Equipment & Furnishings	0.1	$0.15	$8,500
Subtotal	100%	$156.06	$9,084,775
Contractor Fees	25%	$39.02	$2,271,193.75
Architectural Fees	7%	$10.92	$635,934.25
Total Building Cost		$206.00	$11,991,903

Modular concrete blockwork

Based on a traditional technique where quartz is embeded in white plaster, the transparent glass bottles were crushed and added to the white cement surface.

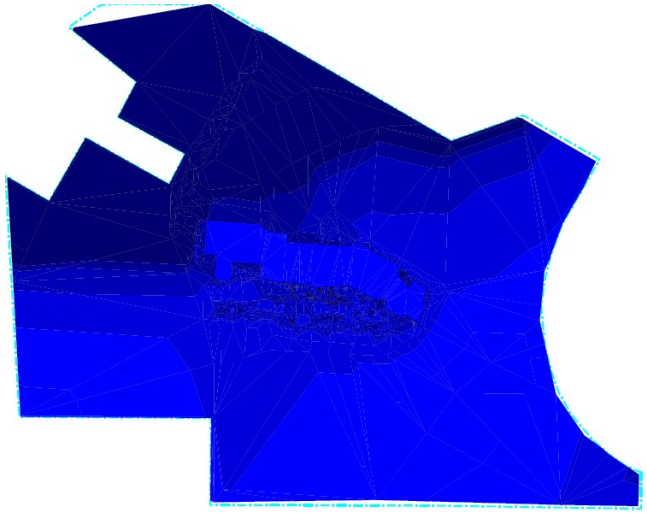
Offset, rectangular pre-patinated copper cladding

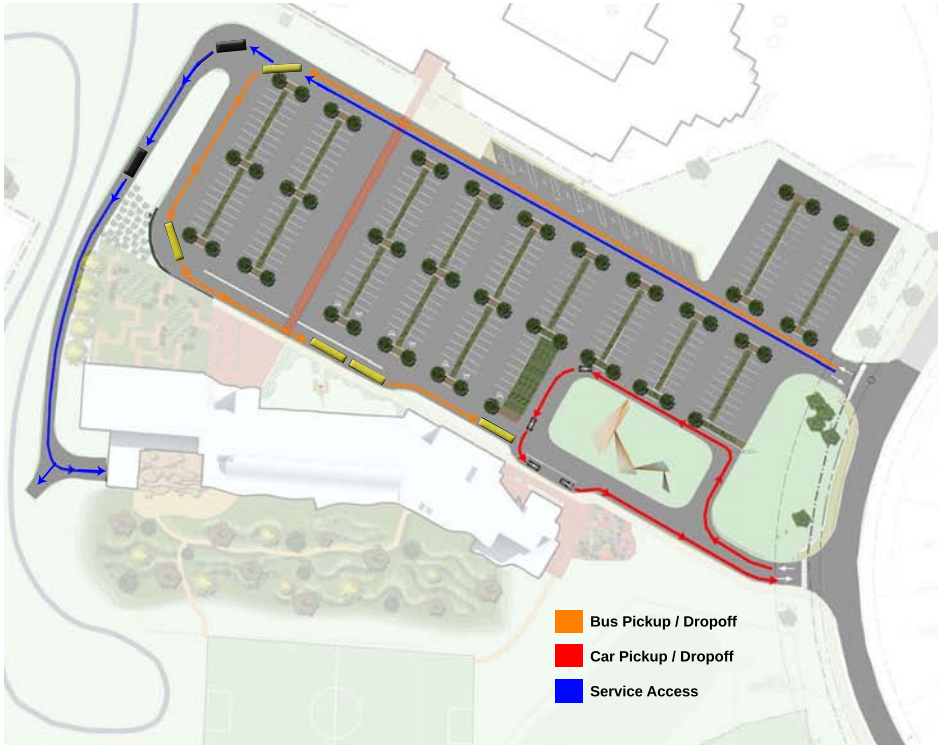
Final Design

The final design phase consisted of the creation of all final presentation materials and renderings. The design at this point was finalized with all materials and specifications. Coordination between all six disciplines was at its highest intensity with each individual working with multiple software programs using the same 3D model central file. The interoperability of programs was crucial in performing site work calculations, load and stress calculations, mechanical runs and supply calculations, luminance levels, and construction costs.

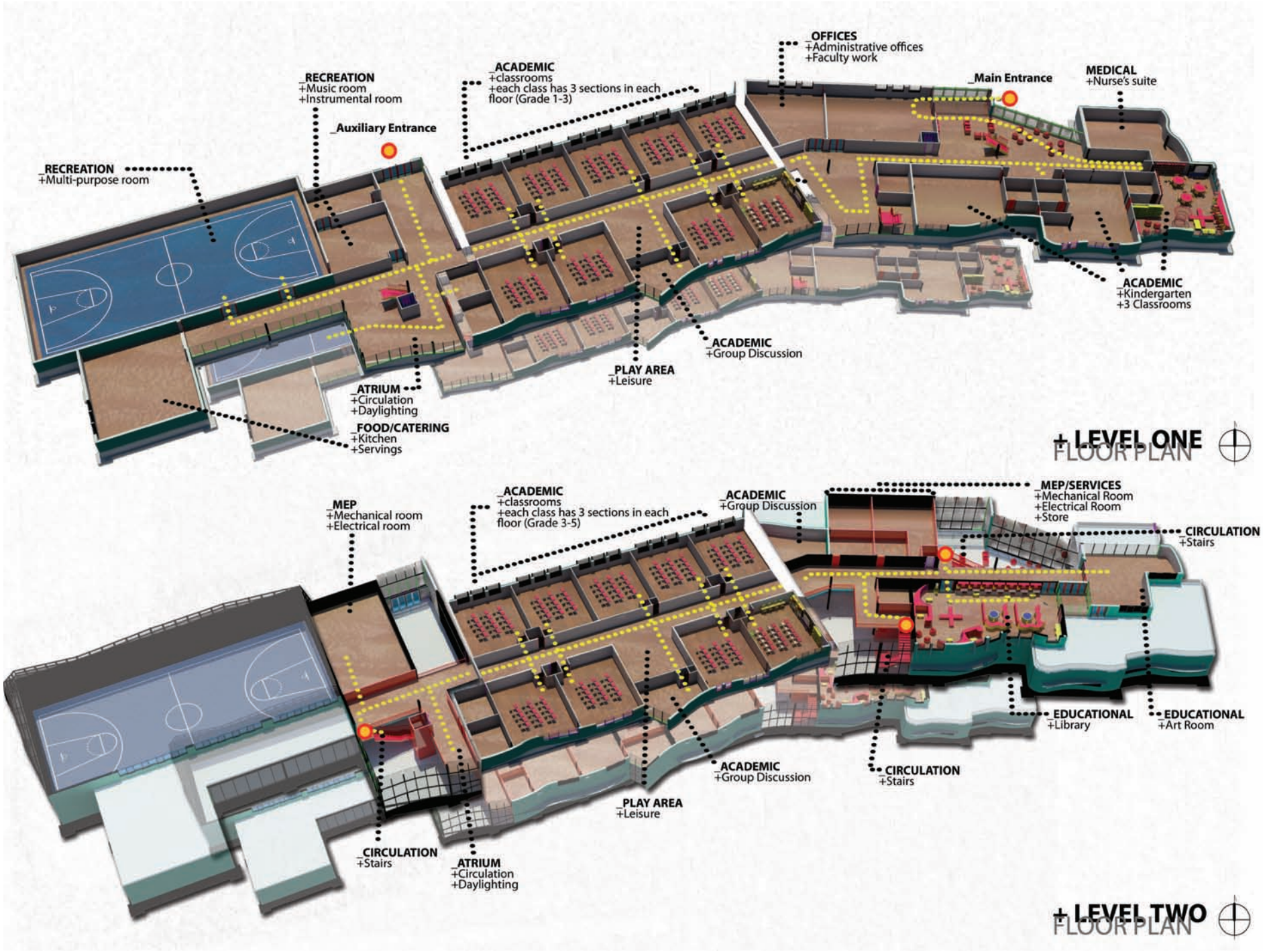
Cut – 54,655 Cu. Yds
Fill – 38,919 Cu. Yds.

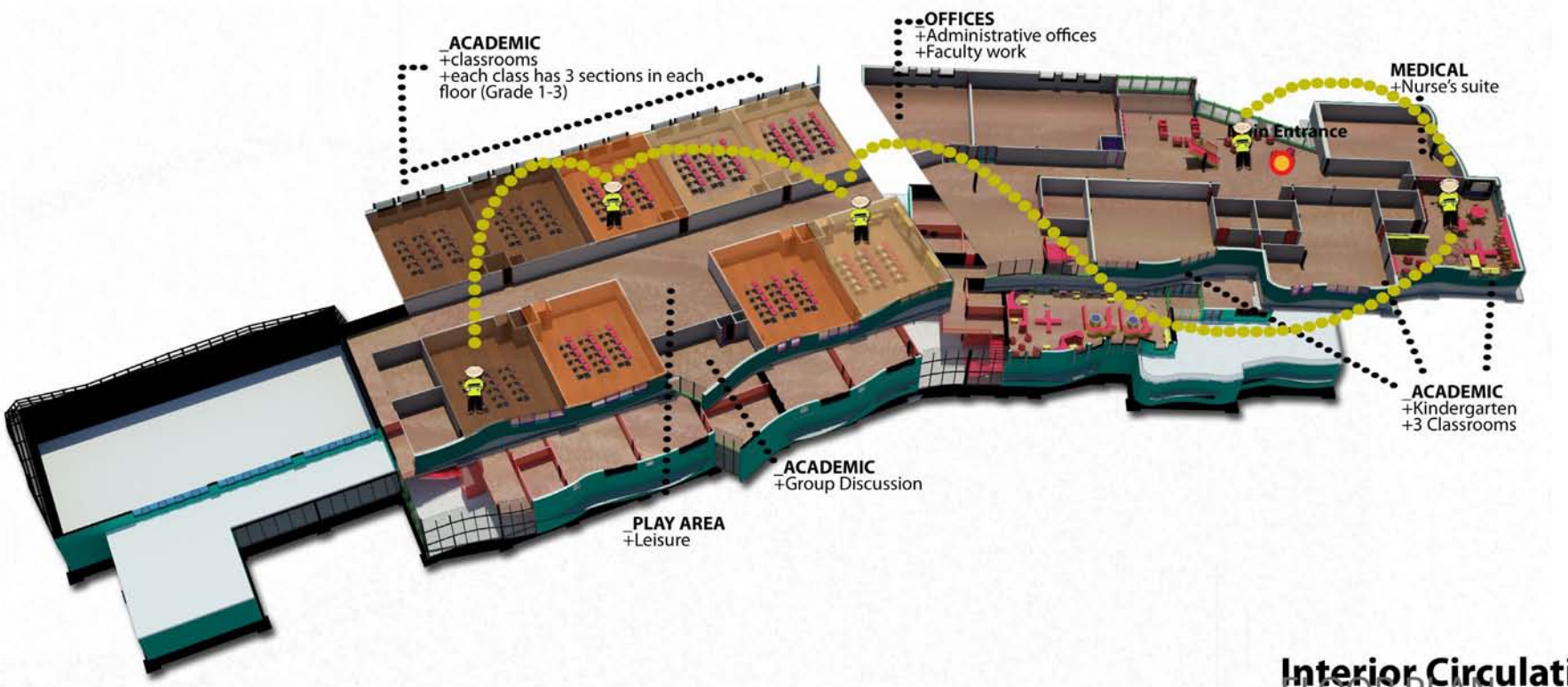
Net – 15,735 Cu. Yds. Cut



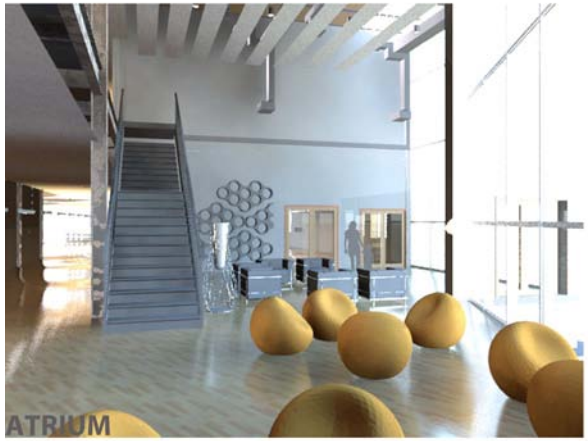


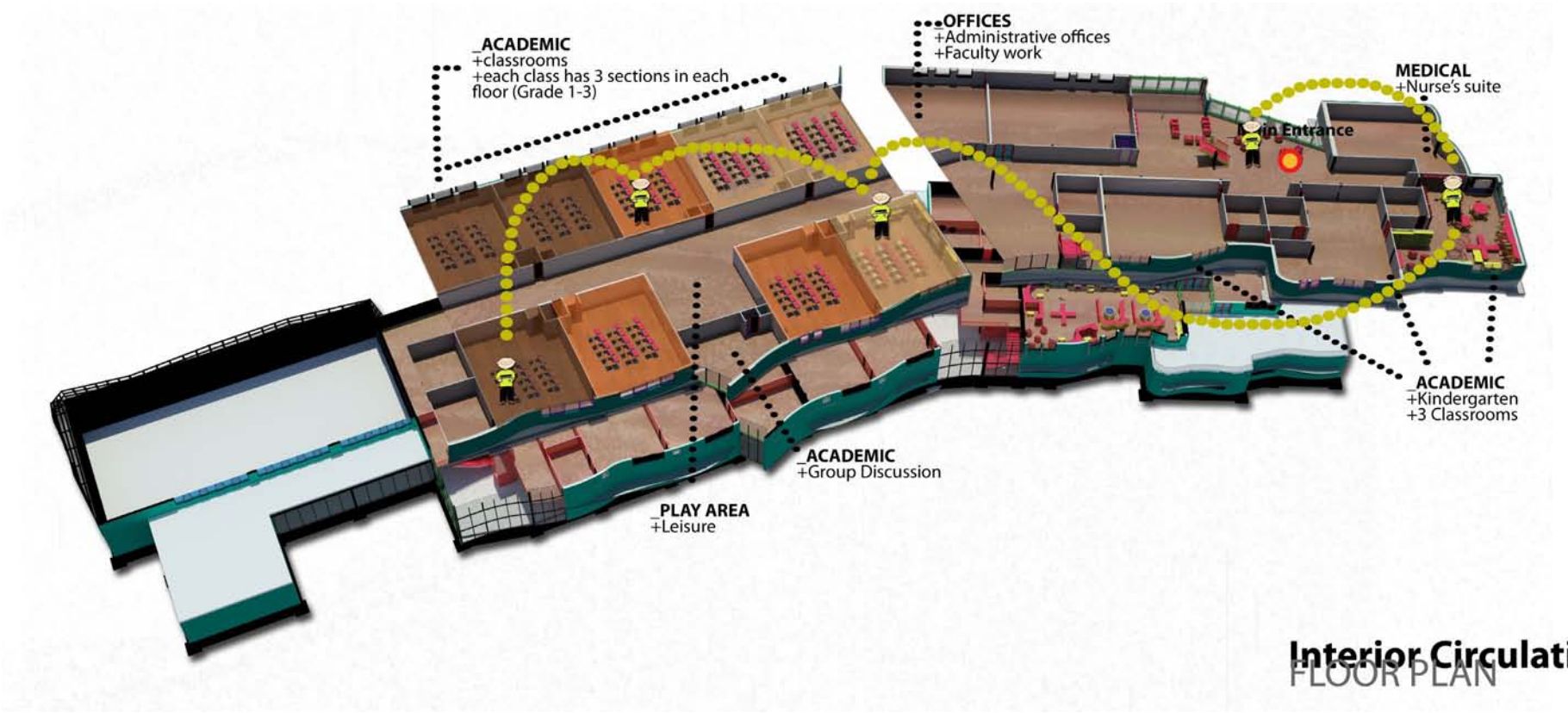
Landscape Design


_OFFICES
+Administrative offices
+Faculty work
_RECREATION
+Music room
+Instrumental room
_ACADEMIC
+classrooms
+each class has 3 sections in each floor (Grade 1-3)
_Main Entrance
MEDICAL
+Nurse's suite
_Auxiliary Entrance
_RECREATION
+Multi-purpose room
_ACADEMIC
+Kindergarten
+3 Classrooms
_ACADEMIC
+Group Discussion
_PLAY AREA
+Leisure
_ATRIUM
+Circulation
+Daylighting
_FOOD/CATERING
+Kitchen
+Servings
+ LEVEL ONE
FLOOR PLAN
_MEP
+Mechanical room
+Electrical room
_ACADEMIC
+classrooms
+each class has 3 sections in each floor (Grade 3-5)
_ACADEMIC
+Group Discussion
_MEP/SERVICES
+Mechanical Room
+Electrical Room
+Store
_CIRCULATION
+Stairs
_EDUCATIONAL
+Library
_EDUCATIONAL
+Art Room
_ACADEMIC
+Group Discussion
_CIRCULATION
+Stairs
_PLAY AREA
+Leisure
_CIRCULATION
+Stairs
_ATRIUM
+Circulation
+Daylighting
+ LEVEL TWO
FLOOR PLAN

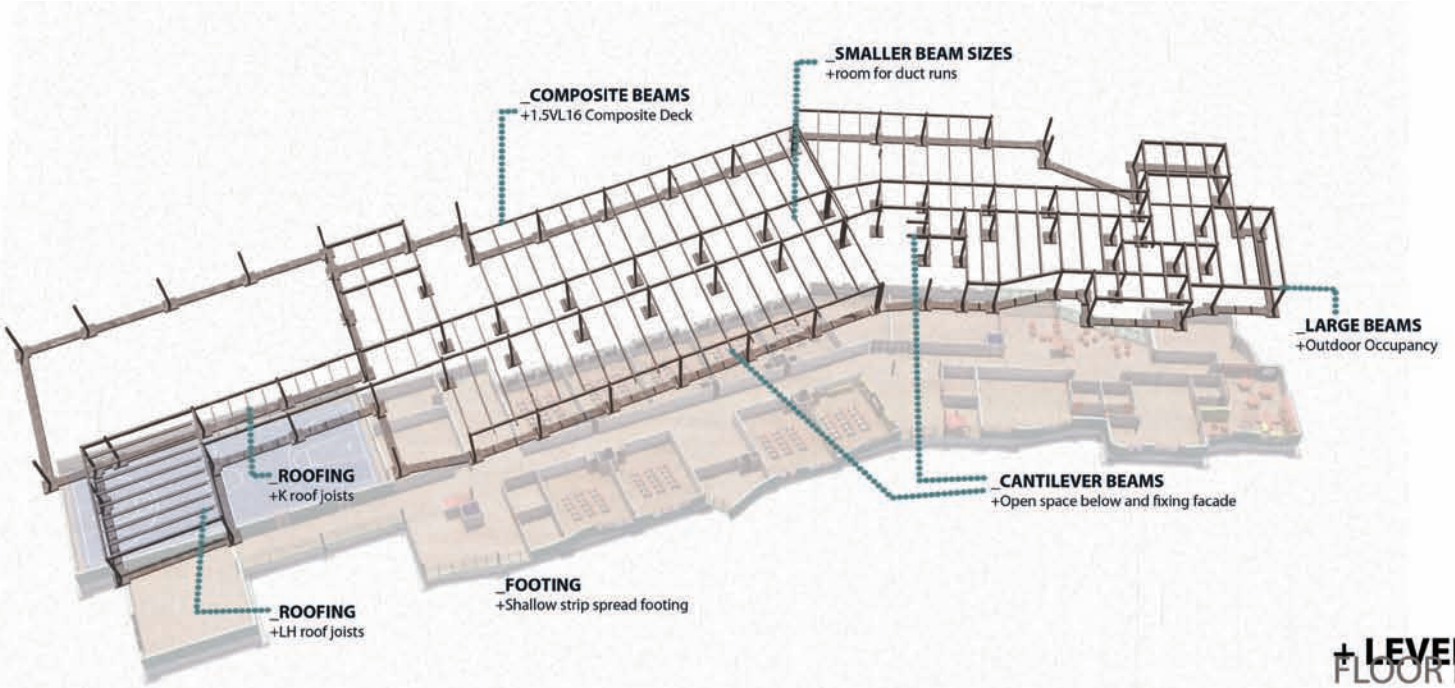


Interior Circulation
FLOOR PLAN

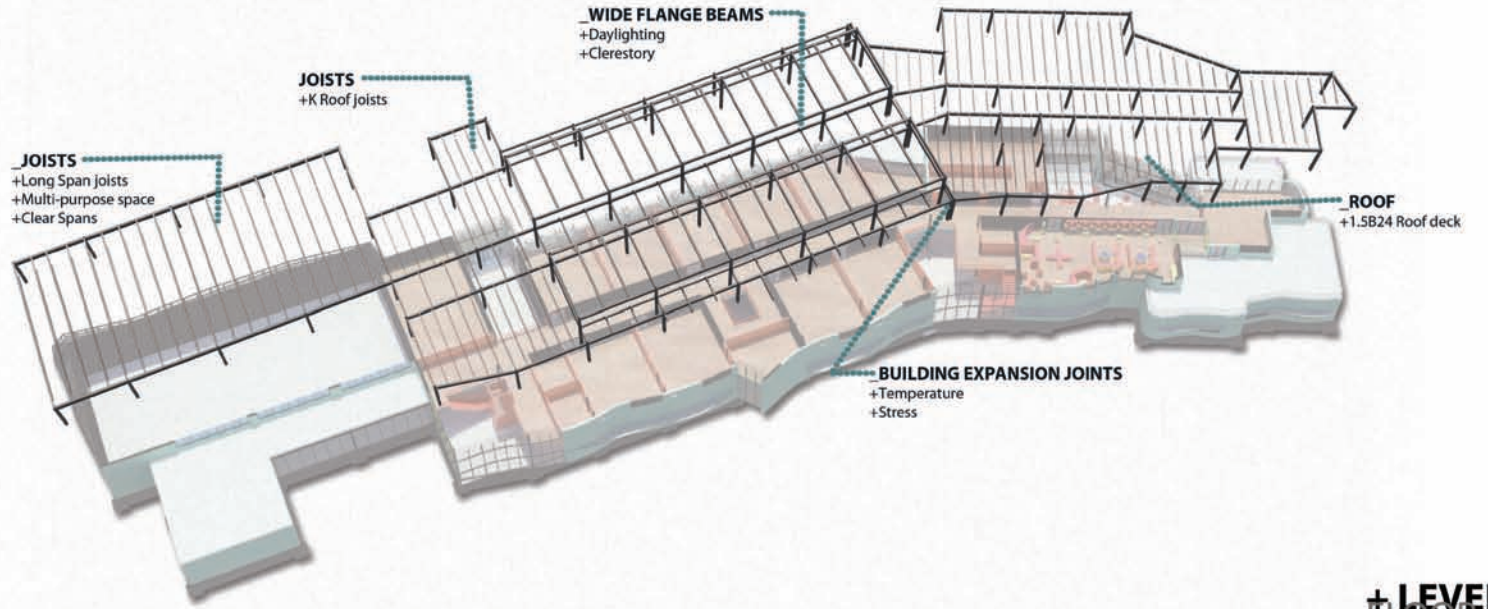




Interior Circulation
FLOOR PLAN



+ LEVEL ONE FLOOR PLAN



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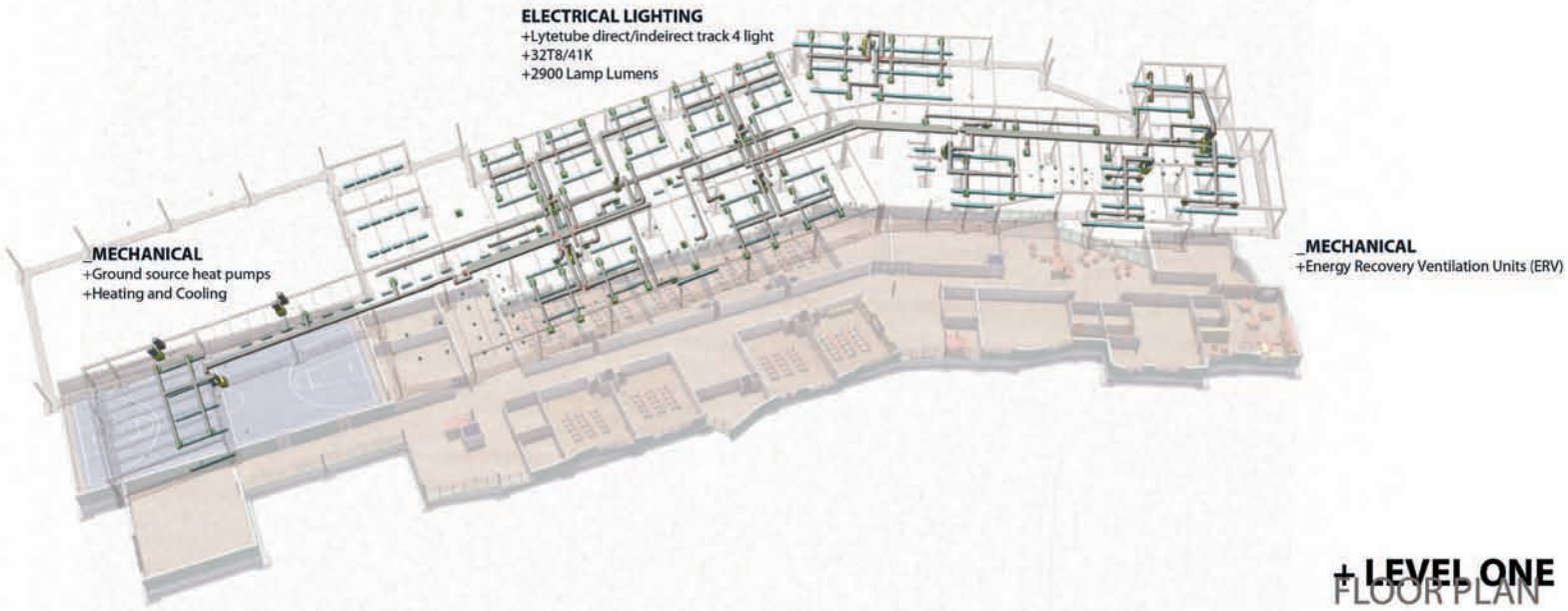
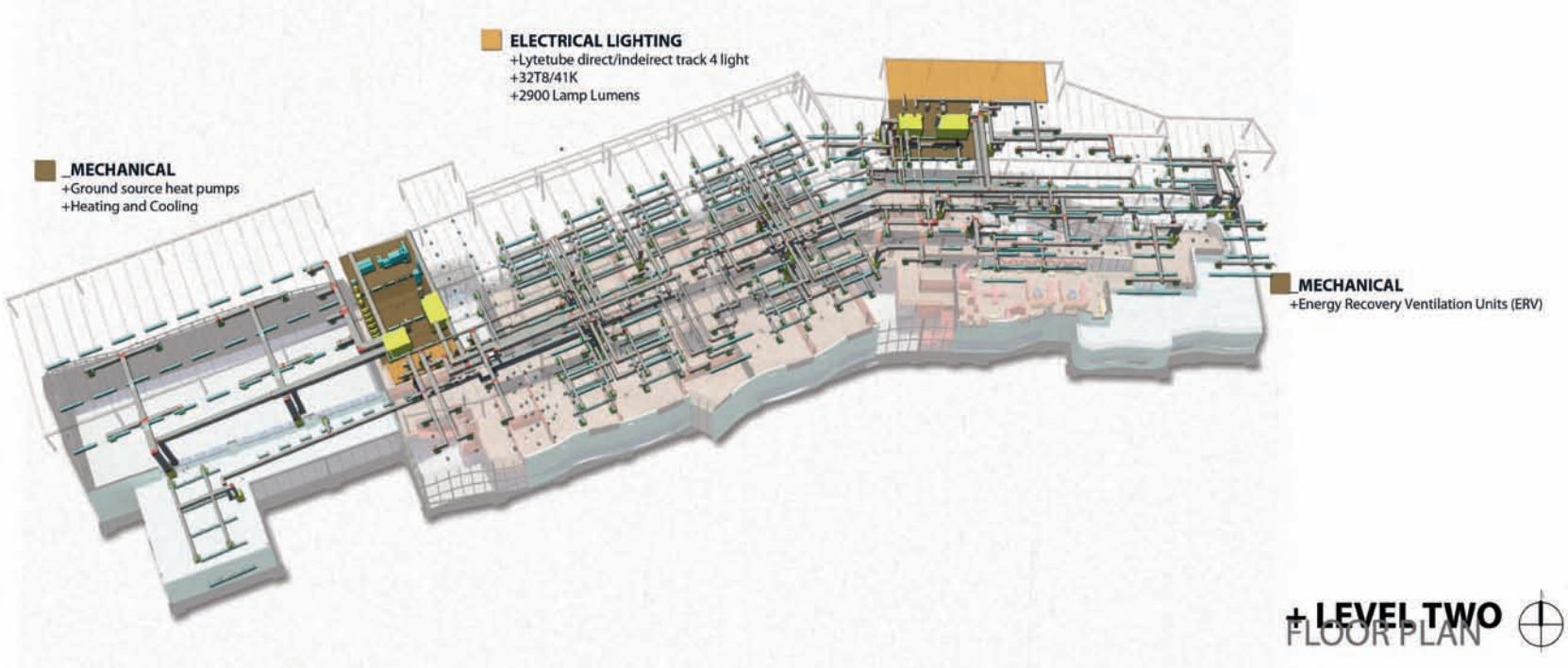
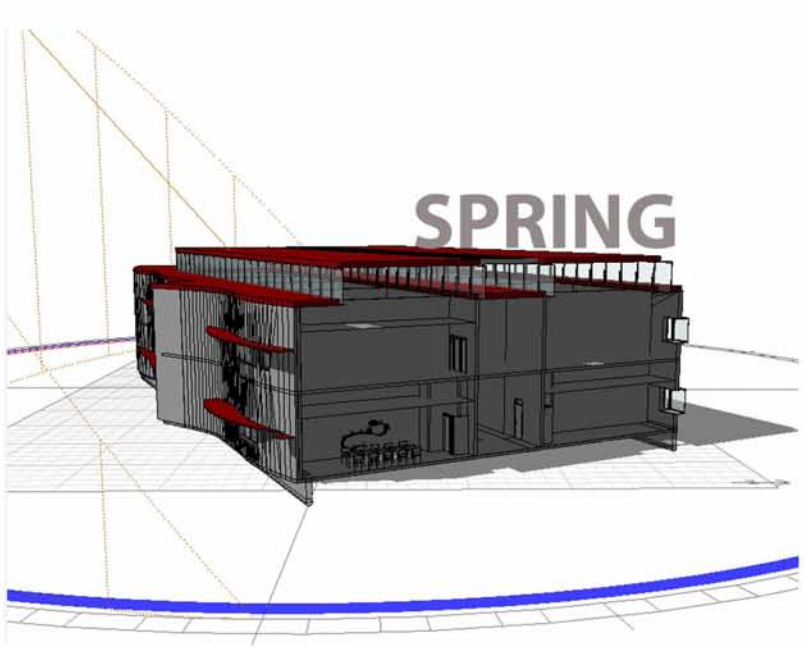
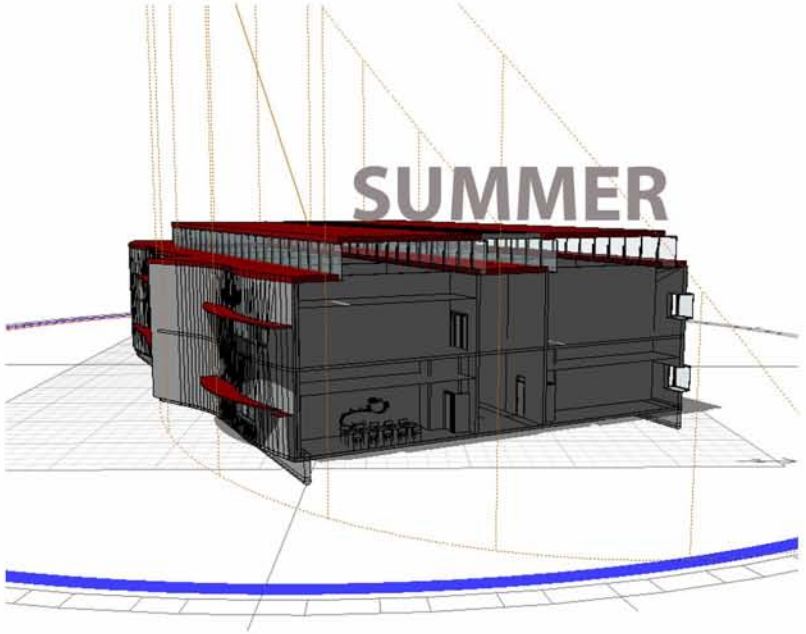


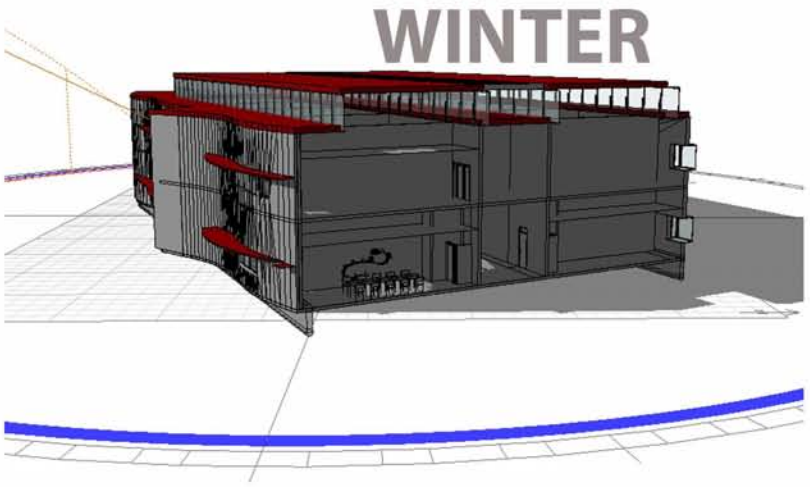
+ LEVEL ONE
FLOOR PLAN

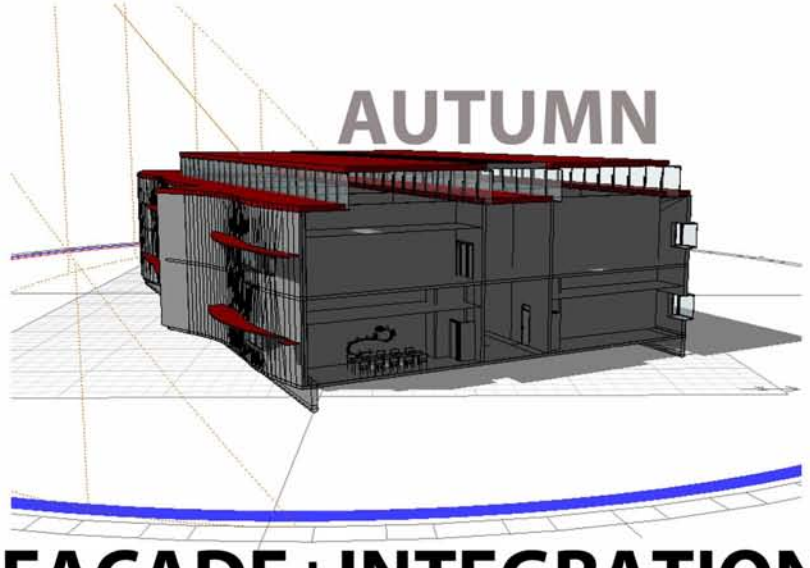


+ LEVEL TWO
FLOOR PLAN

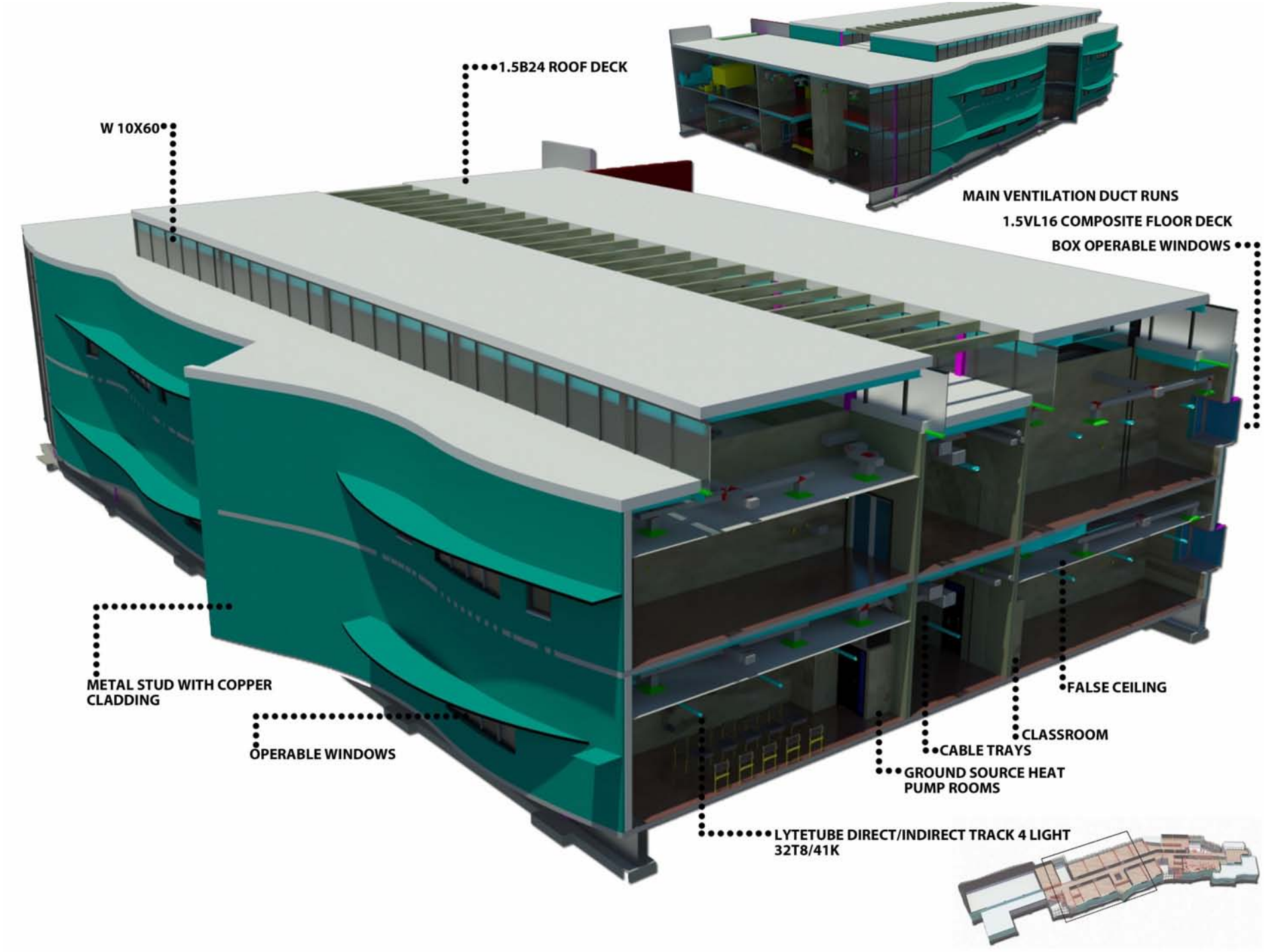


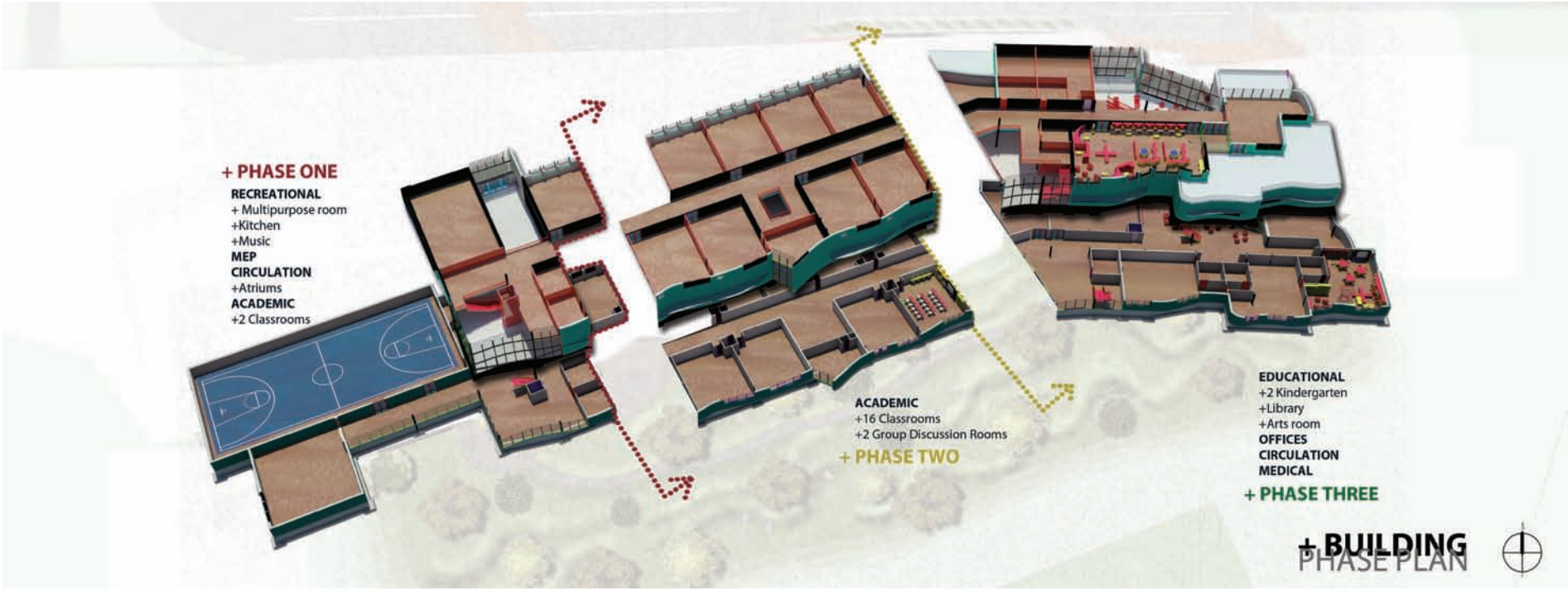




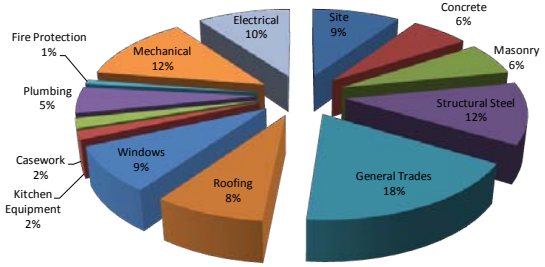


FACADE+INTEGRATION
COLLABORATION

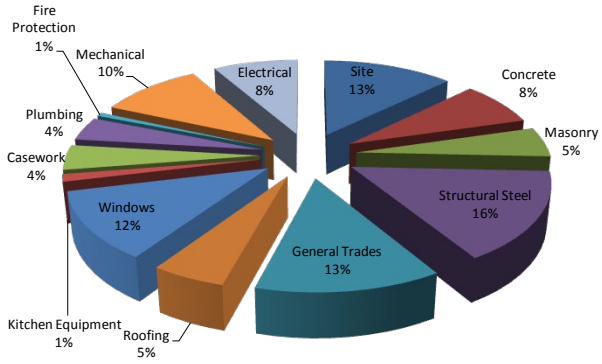

1.5B24 ROOF DECK
W 10X60
MAIN VENTILATION DUCT RUNS
1.5VL16 COMPOSITE FLOOR DECK
BOX OPERABLE WINDOWS
METAL STUD WITH COPPER CLADDING
OPERABLE WINDOWS
FALSE CEILING
CLASSROOM
CABLE TRAYS
GROUND SOURCE HEAT PUMP ROOMS
LYTETUBE DIRECT/INDIRECT TRACK 4 LIGHT 32T8/41K



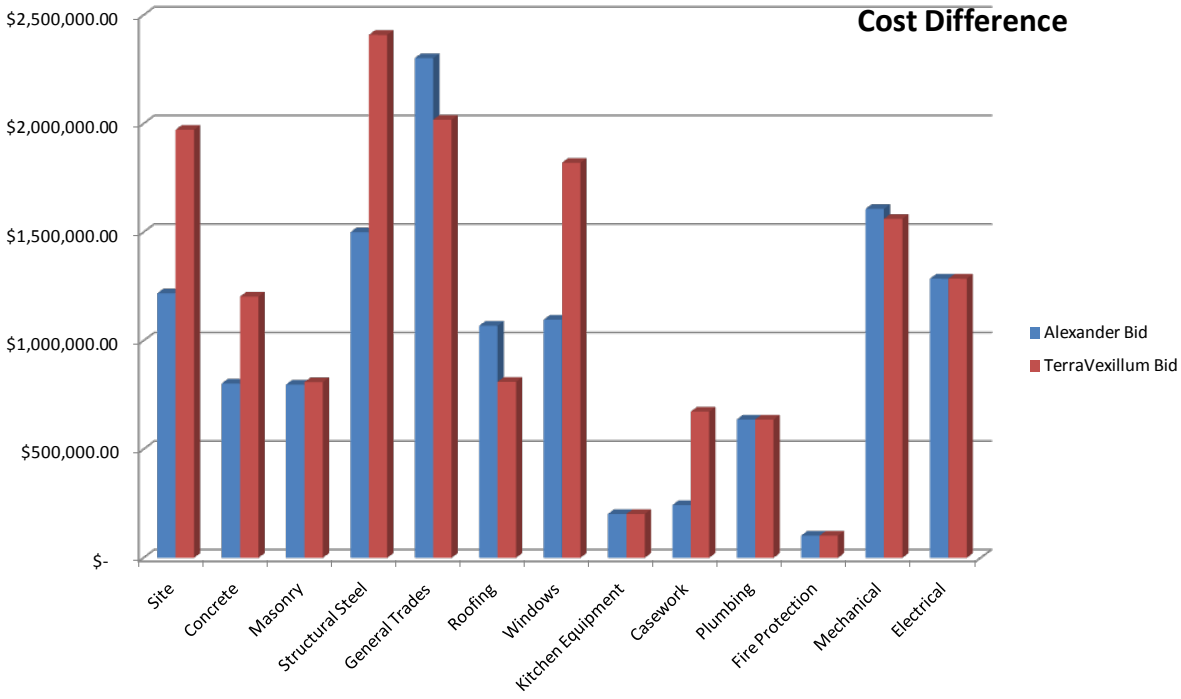
Alexander Bid Breakdown



TerraVexillum Bid Breakdown



Cost Difference



LEED 2009 for Schools New Construction and Major Renovations

Project Checklist

Mt. Nittany Elementary School Project Name

27 April 2011 Date

Points achieved: 19

Sustainable Sites — Possible Points: 24

Y	?	N			
Y			Prereq 1	Construction Activity Pollution Prevention	
Y			Prereq 2	Environmental Site Assessment	
Y			Credit 1	Site Selection	1
Y			Credit 2	Development Density and Community Connectivity	4
		N	Credit 3	Brownfield Redevelopment	1
Y			Credit 4.1	Alternative Transportation—Public Transportation Access	4
Y			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
		N	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	2
Y			Credit 4.4	Alternative Transportation—Parking Capacity	2
		N	Credit 5.1	Site Development—Protect or Restore Habitat	1
Y			Credit 5.2	Site Development—Maximize Open Space	1
Y			Credit 6.1	Stormwater Design—Quantity Control	1
Y			Credit 6.2	Stormwater Design—Quality Control	1
Y			Credit 7.1	Heat Island Effect—Non-roof	1
		N	Credit 7.2	Heat Island Effect—Roof	1
Y			Credit 8	Light Pollution Reduction	1
Y			Credit 9	Site Master Plan	1
Y			Credit 10	Joint Use of Facilities	1

Points achieved: 6

Water Efficiency — Possible Points: 11

Y			Prereq 1	Water Use Reduction—20% Reduction	
Y			Credit 1	Water Efficient Landscaping	2 to 4
Y			Credit 2	Innovative Wastewater Technologies	2
Y			Credit 3	Water Use Reduction	2 to 4
		N	Credit 3	Process Water Use Reduction	1

Points achieved: 10

Energy and Atmosphere — Possible Points: 33

Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
Y			Credit 1	Optimize Energy Performance	1 to 19
		N	Credit 2	On-Site Renewable Energy	1 to 7
		N	Credit 3	Enhanced Commissioning	2
		N	Credit 4	Enhanced Refrigerant Management	1
		N	Credit 5	Measurement and Verification	2
		N	Credit 6	Green Power	2

Points achieved: 12

Materials and Resources — Possible Points: 13

Y			Prereq 1	Storage and Collection of Recyclables	
Y			Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 2
		N	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
Y			Credit 2	Construction Waste Management	1 to 2

Materials and Resources, Continued

Y	?	N			
Y			Credit 3	Materials Reuse	1 to 2
Y			Credit 4	Recycled Content	1 to 2
Y			Credit 5	Regional Materials	1 to 2
Y			Credit 6	Rapidly Renewable Materials	1
Y			Credit 7	Certified Wood	1

Points achieved: 14

Indoor Environmental Quality — Possible Points: 19

Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
Y			Prereq 3	Minimum Acoustical Performance	
Y			Credit 1	Outdoor Air Delivery Monitoring	1
Y			Credit 2	Increased Ventilation	1
Y			Credit 3.1	Construction IAQ Management Plan—During Construction	1
		N	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
		N	Credit 4	Low-Emitting Materials	1 to 4
Y			Credit 5	Indoor Chemical and Pollutant Source Control	1
Y			Credit 6.1	Controllability of Systems—Lighting	1
Y			Credit 6.2	Controllability of Systems—Thermal Comfort	1
Y			Credit 7.1	Thermal Comfort—Design	1
Y			Credit 7.2	Thermal Comfort—Verification	1
Y			Credit 8.1	Daylight and Views—Daylight	1 to 3
Y			Credit 8.2	Daylight and Views—Views	1
Y			Credit 9	Enhanced Acoustical Performance	1
Y			Credit 10	Mold Prevention	1

Points achieved: 2

Innovation and Design Process — Possible Points: 6

	?		Credit 1.1	Innovation in Design:	1
	?		Credit 1.2	Innovation in Design: Specific Title	1
	?		Credit 1.3	Innovation in Design: Specific Title	1
	?		Credit 1.4	Innovation in Design: Specific Title	1
Y			Credit 2	LEED Accredited Professional	1
Y			Credit 3	The School as a Teaching Tool	1

Points achieved: 2

Regional Priority Credits — Possible Points: 4

Y			Credit 1.1	Regional Priority: Material selection	1
Y			Credit 1.2	Regional Priority: Landscaping	1
			Credit 1.3	Regional Priority: Specific Credit	1
			Credit 1.4	Regional Priority: Specific Credit	1

Total points achieved: 65

LEED Gold

Total — Possible Points: 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

STATE COLLEGE AREA SCHOOL DISTRICT
Mount NIttany School

ARCHITECTURAL SPACE PROGRAM

The designed architectural space calculations:

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stage	1	@	1370 s.f.	1370 s.f.	
full service kitchen	1	@	1600 s.f.	1600 s.f.	
library	1	@	1700 s.f.	1700 s.f.	(includes work room+ office)
full size music room	1	@	1000 s.f.	1000 s.f.	
instrumental music room	1	@	1100 s.f.	1100 s.f.	(includes storage)
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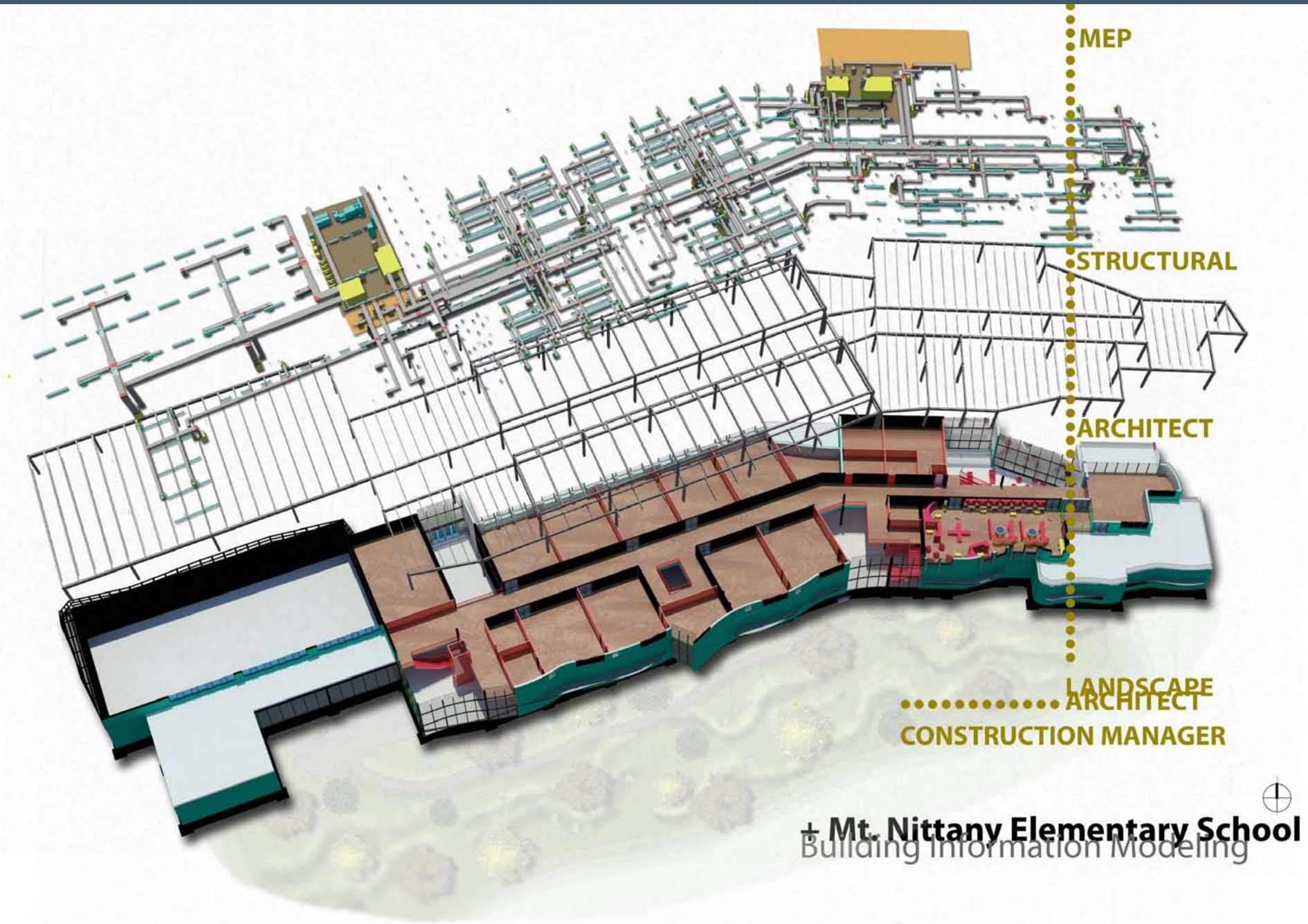
nurse's suite	1	@	870 s.f.	870 s.f.	
bathrooms	5	@	450 s.f.	2250 s.f.	
faculty lunch	1	@	400 s.f.	400 s.f.	
Storage/Extra	1	@	248 s.f.	248 s.f.	
faculty work	1	@	380 s.f.	380 s.f.	
			Total Net Area	**39358 s.f.**	
			Circulation/MEP	**19903 s.f.**	

Total Gross Area 59,261 s.f.
(original program was 58333 s.f.)

Terra Vexillum
Architecture I Landscape | Engineering


MEP
STRUCTURAL
ARCHITECT
LANDSCAPE ARCHITECT
CONSTRUCTION MANAGER
Mt. Nittany Elementary School
Building Information Modeling

Appendix

Building Codes

Building Codes

Applicable Codes

2006 International Building Code

Occupancy Classifications (per Occupant)

Mech/Storage = 300 gsf

Assembly w/o fixed = 7 nsf

Educational

- Class = 20 nsf
- Vocational = 50 nsf

Kitchen = 200 gsf

Stage = 15 nsf

Library

- stacks 50 nsf
- reading 100 gsf

Educational (E) per Section 305.1

Occupant factor: 400 Occupants

Total Area: 57830

Egress Requirements

Minimum number of exits required = 2	Provided	5
Minimum corridor width = 72"	Provided	96" min.
Maximum Travel Distance to Exit	250'	From IBC Table 1015.1
Minimum Egress Width	0.2" X 400= 80"	
Provided	54X2+51X1 = 159"	>80"

Plumbing

Water Closets	1 per 50
Lavatories	1 per 50
Drinking Fountains	1 per 50

Construction Type Classifications

Type IIB per IBC 2006 Table 503

I_f = [F/P -0.25] W/30 = [1-0.25] 30/30 = 0.75

Is = 2

Aa = {At + [AtXIf] + [AtXIs]} = 14500+10875+29000 = 54375 sq. ft / Floor.

with sprinkler system

Fire Resistance Rating Requirements for building elements

Building Element	Type IIB
Structural Frame	0
Bearing Walls	
Exterior	0
Interior	0
Non Bearing Walls and Partitions	
Exterior	0
Interior	0
Floor Constructions (inc. beams and joists)	0
Roof Construction (inc. beams and joists)	0

Interior Finish

Interior Wall and Ceiling finishes (per IBC Table 803.5)

Corridors	min. Class C
Rooms/Enclosed spaces	min. Class C